Telephony

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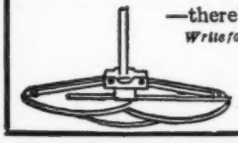

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Telephony.

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By the Way—

Physical connection of telephone lines is again in the courts.

The Minnesota Railroad & Warehouse Commission last spring ordered physical connection at Owatonna between the Northwestern (Bell) exchange and the toll lines of the Tri-State.

The order also provided for a differential charge of ten cents. And the Bell company appealed the case to the district court, just as it did in the La Crosse case.

Last week Judge Childress at Owatonna entered his order upon the appeal. He affirmed the commission's order regarding physical connection—but reversed that part of it providing for the differential.

Spurlos Versenkt.

When one sinks a ship, leave no trace. When one kills a man, hide the body. When one burns a home, be sure that the family is asleep and will awaken too late to escape. And by all means, when one starts out to ruin a competitor, be sure that not only the property will be destroyed, but the stockholders as well.

"Spurlos Versenkt" is not a new doctrine in industrial circles, for it has been the practice for predatory corporations for a generation—at least until the public awakened to its danger and attempted to check it.

Who does not remember the successful little cracker factory, the thrifty butcher who killed his own product, and the bee song of the busy little factory down by the side track? Not a trace of them can be found, for the cracker factory has fallen into ruin, corn now grows on the site of the slaughter house, and charred ruins mark the site of a factory which once furnished employment to many families, and gave hope of a larger city to come.

It was a case of "spurlos versenkt"—sunk by the merciless guns of the cracker trust, the beef trust, and the trust which undersold the factory to a heedless local public. The manufacturer who sells his product at cut prices has favored customers, or uses undue influences to secure business which belongs normally to others—such a man has nothing on the suggestion of the ferocious Luxburg.

A large utility invading local territory, competing with cut prices, as well as unusual advantages, giving service for six dollars a year, or at prices less than cost, has given precedence to the murderous suggestion of spurlos versenkt.

A group of farmers, rich with $3 wheat, $1.50 corn, and $20 hogs, operating a telephone company as a side issue, commits spurlos versenkt the moment they depart from strict mutuality and compete with a local company at cut prices or by threats of agricultural boycott.

A group of laboring men, in ship yard or in railroad work, or a group of telephone operators, striking for absurdly extreme hours and wages, taking advantage of the country at war, are merely practicing spurlos versenkt, lending their aid to a policy which will leave no trace of the American republic.

One of the most hopeful signs of the times is the manner in which great corporation men have flocked to the aid of the government, giving their time and means to make democracy safe. Many of these men in the past have been guilty of spurlos versenkt. They have engaged in the inhuman practice of leaving no trace of competitors. And have only ceased the practice because our anti-trust laws have restrained them.

They will come close to the pulse of the country, in fact they will have a chance to see the great heart of the country, the living, breathing individual who is so necessary to our defense. They will realize that these men have names; that they have ceased to go by numbers, and that they have families who have hopes and desires, and deserve to have some place in the sun of life.

Seeing all this, and realizing our common danger, it is to be hoped that groups of men will never again indulge in the ruin of thousands and the embitterment of millions. They surely have seen the light by this time.

Surely the lesson of "spurlos versenkt" will sink deep into the trust mind and it is to be hoped that it will sound the death knell of unfair play throughout the world. The unspeakable Luxburg has not bungled in vain. Democracy as well as industry will yet be made safe.

A Modern Telephone Organization

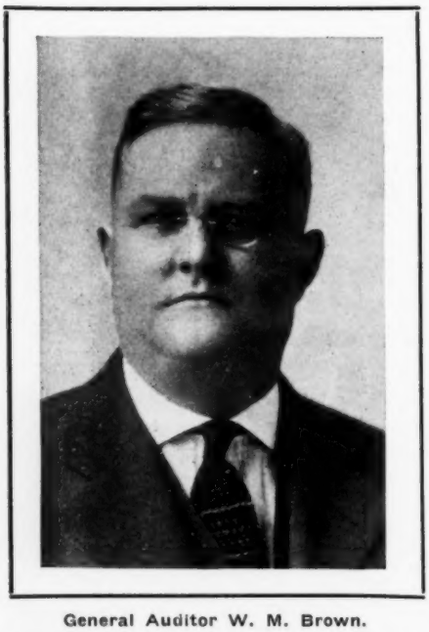
Principles of Organization and Management and Their Utilization in the Operation of the Central Home Telephone & Telegraph Co.—Details of Its Organization—Application of Modern Ideas in the Company's Management

By Stanley R. Edwards

Never before has so much attention been given to organization and management as has been the case in the last few years. Conditions have arisen which have necessitated a close study of organization in order to develop a working force that will operate to the greatest efficiency, to the end that the business may be conducted profitably.

The telephone field has not been an exception to the tendency toward better organization. When the industry was young the margin of profit, in many cases, was sufficient to take care of any errors in organization principles. The upward trend of costs of all kinds, however, and the regulation of rates and service by the various public utility commissions, to say nothing of competitive conditions which many companies face, all aided in bringing about greater consideration of organization principles in order that the business might still continue to be profitable. And those companies which have made a study of organization and management are the ones that are being operated in a manner which is satisfactory to their owners or stockholders.

In the telephone business all forms of various types of organization are found—



General Auditor W. M. Brown.

the unsystematized and the systematized, the functional and the divisional, and all their combinations. In the smaller companies with but few employes, the military form of organization where the operating authority concentrates in the president and manager is the most prevalent. In the larger companies, however, especially the Bell organizations, the functional type is found. In other companies, a combination of the functional and divisional form prevails. Of such a form of organization is the Central Home Telephone & Telegraph Co., which has its headquarters in Louisville, Ky.

General Manager S. M. Heller.

The present organization of this company has resulted from the experience of years, which has shown the type of organization best adapted to its needs. It was in November, 1905, that the company was incorporated under the laws of Delaware as the Central Home Telephone Co. Its purpose was to acquire, by construction or purchase, a comprehensive system of long distance lines and local exchanges in Kentucky and southern Indiana. In the area bounded by Maysville, Ky., on the east, Mayfield, Ky., on the west, Guthrie, Ky., on the south and Bloomington, Ind., on the north, 40 exchanges were acquired, all connected to toll circuits approximating 4,000 miles.

A reorganization of the company occurred in 1910. The name was changed to the Central Home Telephone & Telegraph Co. and the policy altered so as to concentrate operations, as far as possible, in Kentucky. The local exchanges in Indiana were disposed of, while the long distance lines were retained. The capital obtained from the sale of the Indiana plants was invested in Kentucky properties.

Since the reorganization the company has overcome many difficulties, operating and financial, and is now in a most stable condition. The reorganization plans provided for the issuance of $2,000,000 capital stock and a bonded indebtedness of $350,000. No additional outside capital has since been secured, all funds for financing the extensions and improvements having been provided from earnings.

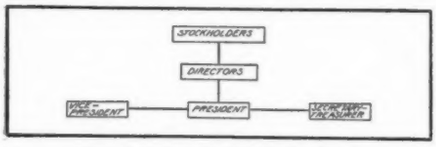
The accompanying chart shows the lines of authority in the business or operating organization of the company. It will be noted that all authority centers in General Manager S. M. Heller. Reporting to him direct are the heads of the three departments of the company—the maintenance or plant under General Superintendent Minor Corman, the commercial, under General Auditor W. M. Brown, and the operating or traffic under Traffic Manager W. M. Paine.

The general manager is the tie between the corporate organization and the operating organization. The first-mentioned organization consists of the stockholders, the board of directors, the president, the vice-president, the secretary and the treasurer. The general manager is really "the mainspring" of the active business

General Superintendent Minor Corman.

end of the company. It is his duty to so carry out the policies of the company, transmitted to him by the president, representing the board of directors, as to obtain satisfactory results.

Theoretically, the general superintendent is entrusted primarily with the general supervision of the physical property of the exchanges and long distance lines. The traffic manager has supervision of local and long distance traffic, while the



The Corporate Organization.

general auditor supervises the commercial department which includes records, collections, new business, etc. In practice, however, these three departments work together as one. The general superintendent, for example, spends a great portion of his time at the local exchanges and handles all details of commercial and traffic matters, while the traffic manager is, in turn, the right-hand man of the general superintendent in plant matters.

The heads of these three departments are men who are thoroughly imbued with the thought that company success rather than individual success is the great essential. This spirit leads to harmony and the highest possible co-operation between departments and with the general manager.

In the carrying out of the organization plans it was found desirable to divide the territory in which the company operates into three districts, the central, eastern and western—and it so happens that the revenues of each district are practically the same. This, as will be

Traffic Manager W. M. Paine.

shown later, is an important factor in the successful management of the company. The central district reports directly to the central office at Louisville; the eastern district to District Manager J. J. Veatch, at Paris, Ky., while B. Y. Chambers, at Paducah, Ky., is in charge of the western district.

As indicated by the organization chart, the district managers are responsible to the general departmental heads at Louisville.

Each district has its own organization of employes who are under authority of the local or exchange managers. The local managers, while theoretically responsible to the district managers are, to some extent, directly responsible to the general superintendent, the general auditor and traffic manager, inasmuch as these three department heads are necessarily very much interested in the conduct of the local exchanges.

This form of organization, it can be readily seen, tends to develop all around telephone men rather than specialists. It may be stated that it is characteristic of the organizations of Independent telephone companies in general to develop all around telephone men, so that the man who has attained prominence in the Independent telephone field is a many-sided man and extremely versatile.

While a good organization is necessarily essential to the success of any business concern, its management is also a vitally contributing factor. The best organization in the world cannot succeed if its officers are unprogressive, inefficient and do not harmonize in their work. The Central Home organization is backed up by a progressive and efficient management. Co-operation and the intelligent direction of the energies of every employe for the attainment of results are prominent characteristics of the management.

It has been previously stated that the revenues of each of the three districts of the Central Home Telephone & Telegraph Co. are practically the same and this fact has been taken advantage of by the company's executives. Friendly rivalry exists between the districts in such matters as gain in new business, collections, plant maintenance, etc. The general office keeps careful records of the districts and various items are reduced to a percentage basis. Each month the percentage standing is sent to the district and exchange managers.

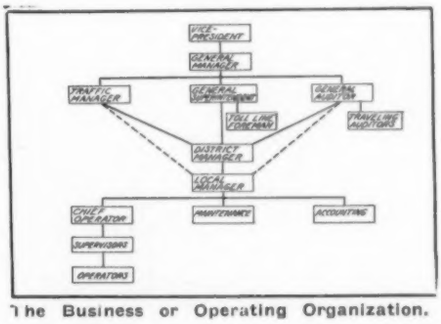
One of the subjects which has received special attention—and rightly so—is collections, for money is most essential for the conduct of any business. For several years past it has been the custom to offer a small cash prize to each exchange having 100 per cent. collections for the six months' period ending June 30 and for the year ending December 31. This has proved a great stimulus to collections, not on account of the value of the prize, which is always moderate, but because of the natural human joy of winning. It is now the exception when one exchange fails to collect full charge.

Not only has this spirit of competition between districts had the effect of making collections good after installations are made but local managers now exercise great care in the class of business which they take. In campaigns for new business, great success has been attained

Eastern District Manager J. J. Veatch.

through the hearty co-operation of all of the local employes. This co-operation has been developed by means of frequent educational and social meetings of employes at the different exchanges in each district. These meetings have resulted in the employes taking a greater interest in the business and and the creation of a spirit of intense loyalty to the company. The way is thus paved for contests in the various local organizations of the company.

Sides are selected, designated as the "Reds and Blues," or some other name with punch to it, and each side is accredited with all new business developed either by a signed contract or a prospect who is signed by the solicitor. At the



The Business or Operating Organization.

end of a predetermined period, the side turning in the lesser number of contracts acts as host at the monthly meeting while the company provides some sort of entertainment.

In the selection of employes and department heads, great care is exercised

to obtain men who are fitted for the position to be filled. That the efforts along these lines have been successful is evidenced by the fact that the period of service of Central Home employes is ordinarily a long one.

Occupational misfits which always give rise to a constantly changing personnel, to say nothing of the loss involved in their training, are unknown in the Central Home organization. The policy of careful selection of employes has fully justified itself by the results which have been attained in making the company's force harmonious and aggressive with every man doing his best work.

The local managers and exchanges in the eastern district over which J. J. Veatch presides are as follows:

W. H. Cannon, Paris.
Albert Evans, Little Rock.
M. McClure, Shawhan.
Gano Duncan, Millersburg.
V. H. Parish, Clintonville.
O. L. Peters, North Middletown.
C. M. Mynheir, Cynthiana.
W. C. Corman, Carlisle.
A. B. Roberts, Moorefield.
J. J. Lynch, Maysville.
J. W. O'Bannon, Mayslick.
J. E. Chambers, Frankfort.
J. C. Head, Lawrenceburg and Glensboro.
Geo. W. Bennett, Owenton.

Local managers in the western district under B. Y. Chambers, are:

W. T. Black, Marion and Salem.
E. L. Isaacs, Providence.
C. E. Utley, Clay.
G. C. Gish, Smithland.
J. H. Lock, Mayfield.
V. E. Fisk, Benton.
E. M. Veach, Paducah.

In the central district the managers and the exchanges are:

C. P. Short, Owensboro.
H. P. Myers, Bowling Green.
C. L. Obinchain, Russellville.
M. Marion, Lewisburg.
O. T. O'Bannon, Guthrie.
Robt. T. Main, Morgantown.
O. House, Woodburn.
C. H. Hardesty, Madisonville.
M. M. Welch, Carrollton.

The long distance lines are carefully maintained. Each spring, as soon as the weather permits, crews start out and they work continuously until Christmas. The toll line foreman has supervision of these crews and plans the work and checks up its character and quality.

Organization and management are happily combined in the Central Home Telephone & Telegraph Co. to produce the result for which all business is conducted—the payment of dividends to stockholders. As telephone companies in Kentucky are not subject to regulation by the Kentucky Railroad Commission as regards rates, the rates of the company are determined by its franchises. These franchises specify rates which a few years ago were deemed sufficient to provide a proper margin for profit. But business conditions have changed in the last few years, while the franchises have remained unchanged and bind the company to charge the same rate which prevailed a number of years ago, regardless of the present cost of furnishing service.

Western District Manager B. Y. Chambers.

Harmony and co-operation combined with executive ability are the essential factors which have enabled the management to operate the Central Home organization at high efficiency—an especially important requirement in view of the franchise rates and high costs of every commodity.

How American General Obtained Telephone Lines to Paris.

The telephone men in that part of the United States Signal Corps now in France in connection with the expeditionary forces have already had opportunity to display their skill and dexterity in furnishing necessary facilities for communication, according to recent newspaper dispatches.

It is related that the first day of his arrival, an American general with the first expeditionary forces desired to get in immediate touch with General Pershing, who was still in Paris. While the people in the port were still cheering him he was conducted to the local postoffice, where the telephone lines converge and the booths are located.

He demanded General Pershing's telephone number in Paris.

The girl in charge of the station replied very politely and was considerably agitated at her first view of an American general close up. "Number 23, if you please, sir!"

"Twenty-three?" returned the general in astonishment. "What does that mean? Twenty-three minutes, twenty-three seconds?"

"Twenty-three calls before you, Monsieur le General. It takes about four hours——"

"Cancel the call," ordered the general, shortly, at the same time calling his chief of staff.

"String up four lines of wire between here and Paris and start the work at once," he ordered. "You can use the same poles."

The American army telephone service was at work in five minutes. In ten there was a great hub-bub in the local administration. First a petty officer of the telephone company ran up; he was succeeded by a breathless controller of the telephone lines of the port, then the director himself, until a veritable hierarchy of officials, large and small, was excitedly breathing out expostulations.

"But, Monsieur le General," they cried in a body, "you must have an authorization——"

"We will have," interrupted the general.

"But there must be a commission to examine into this——"

"Very well; appoint one!"

"But there are no competent authorities who must decide——"

"Get them together."

During the whole of this dialogue the telephone men were busily at work. Whether the "authorization" without which all business, whether civilian or of the army, is paralyzed in France, has yet arrived, no one is at all sure. The fact remains that the telephone service is now in working order.

Railroad Distributes Telephone Hints Among Employes.

A number of small pamphlets containing instructions as to the use of the telephone have been distributed among the employes of the Pennsylvania Railroad at all places on the system.

The pamphlet, put out as a part of the company's war economy plans, tells employes how they can save time for themselves and money for the company by a proper use of the telephone. It gives a number of rules for the use of the telephone and the proper method of talking into it, and instructs that all conversations be brief, courteous and confined strictly to business.

New Subscribers Secured by Athens Company.

The Athens County Home Telephone Co., of Athens, Ohio, reports an increase of over 200 subscribers since January. The company has issued a supplement to its regular directory listing the names of these new subscribers.

Some Repetition

Do You Advertise?—Are You Properly Defending Yourself?—Your Local Editor

By J. C. Kelsey

I broke my glasses yesterday. Naturally I cannot see without them, or I would not be bothered with them. The oculist knows this very palpable fact and, unlike the telephone man who knows that the public must have his service, takes advantage of it.

The oculist is in the class with the druggist who, receiving a lead dollar for a prescription for which he had unblushingly charged a dollar, said he would sell the lead and still make a profit. The oculist, always a smiling bandit, has heretofore charged me $2.50 for a single lens which came direct from the manufacturer at the cost of a quarter.

It seems that there is a war in Europe and it has become difficult to get a supply of glasses because so many telescopes are needed to keep track of enemies in far-away places. So it became the painful duty of the oculist to raise his price to $3 because these lens now cost somebody 30 cents instead of the usual quarter. Somewhat like the Greek candy bandit, he sticks to the figure ten, and makes fatal use of it.

I looked about the office of the oculist—as soon as I could see. I wanted to know if he had a telephone—and asked him if he needed the telephone, and if he could get along without it. Of course he needed it, just as much as I needed the 10 to 1 glasses. I asked him what his telephone service was costing him, and at once received the amazing reply that he was "paying too much."

It was a question I had forgotten to ask the candy man who refused my nickel, and the collar man, who took two dimes for one collar I needed—but it is a safe bet that the answer to my question would have been "too much."

I was really not surprised about the increase in the cost of the glasses because I had read in the papers that there was to be a raise. It seems that oculists knew something that telephone men do not seem to know—that it was a good thing to let the people know the price was to be advanced and give reasons why. Like the coal men, lumber men, druggists, and other industries, they bought a little space in the daily papers and told their story.

In TELEPHONY'S advertising pages you can see how the pole men meet the economic conditions as they come. They buy space and talk to you, knowing full well that you will be impressed and will act accordingly.

I received a letter from a telephone man in Missouri which shows that our industry is awakening to the call.

"I am buying space in my local newspaper every week, and am trying to write stuff that will make them sit up and take notice." In other words, Mr. Benedict, of Richards, Mo., is properly defending himself by telling the people of the community what it costs him to give them the service they demand. Not only is he telling them what it costs, but what he is doing—what public requirements are—and that he is a human being with the average desires of a man living in their community.

Mr. Benedict could hold back and say his rates were such that he could not afford to advertise. Such an argument would be as futile as an argument that our country should not raise an army or increase the navy, because it has not yet raised the money. The government knows it will raise the money, and the contractors know it, because the public has it and must pay it.

The telephone man knows he can raise the money, and the editor knows it, because the public has the money. And the public must pay it because the law plainly says that since the telephone company has a legal maximum, it has, by natural law of equality, a legal minimum.

Let us get back to the local newspaper, and its owner or editor. In looking back over my life in a country town, two men shine out distinctly in the life of that little place. Both men owned and edited rival weekly papers, and in early days used to say some mean things about each other.

They believed that was necessary in order to keep up a circulation and interest, but learned later that it did not pay. Finally, it was possible for my two heroes to walk down Main street, arm in arm, a little Damon and Pythias stuff, but very impressive.

The town needed waterworks. Time went on, with our little town depending upon a soda fountain fire engine for fire protection, because people of the eighties did not vote bonds as freely as they do now. By and by, the newspaper editors decided that the little town should have a waterworks plant—and they went after it.

Some of the old settlers argued they had operated a pump in the backyard long enough to get used to it, and that mother still seemed able to drag in a bucket of water, and that there was no use of a lazy modern contraption that brought water direct to kitchen or room.

While there was opposition, and lots of it, the waterworks bonding issue carried because the editors wanted it and got it.

The local papers are entitled to support. As a rule, the small town man does not appreciate the value and power of advertising. He is inclined to belittle its value to him or his business, but he is absolutely swayed by what is said in the paper.

Men may carry on disgraceful things in a town for years, and everyone may be aware of it, but the moment the editor exposes it in his paper, the disgrace becomes a public nuisance and the contracting parties leave town in a hurry.

Yet the editor goes on his way—so long as it does not lead by the bank. He owes money there because the people of the town do not realize their responsibilities.

It is not the big city paper which molds the people. The bright sayings and the timely topics seen in a large city paper are mainly from the local papers.

A telephone man recently complained that a large city paper had a prejudice against public utilities, and that it has poisoned the minds of the people all over its territory. Yet, if each local paper carried a weekly advertisement of its public utilities, stating its problems to the community it serves, not only would the influence of the hostile paper be counteracted, but turned to benefit because of its agitation of the question.

No local paper should be allowed to go to press without its share of public utility advertising. One does not bribe the editor by this action—it does not have to be done. No publication in existence, however it may pretend otherwise, is not susceptible to the influence of its advertisers. Besides, the editor has no natural hatred of a public utility because he is really a public utility himself.

The support of the local newspaper is a responsibility of the community, and the telephone man ought to be wise enough to jump in and get credit for being public spirited at the expense of the public.

Some telephone men have sneered at the public utility advertising done by the Bell company. They can sneer all they want to, but even the most prejudiced man will have to admit that it has

never wasted a dollar in advertising—it has paid them many times.

And it will pay the telephone industry, as a whole, to carry the scheme further or by going to the support of the local papers and using proper copy. Our industry would not recognize itself if it went earnestly into its local papers and told the truth. All we need in the telephone business is truth.

Never was the truth so easy to tell about the telephone business as it is today. Give the public the truth every day, and every week, and never let them rest. They are rushing on heedlessly because they are worried by the oculist, the candy man, the collar man, and the rest of the world which so calmly exacts its toll from them. Join the procession!

If they know the truth, and the telephone man has the courage of convictions as well as opportunities, we will have the best business on earth.

I have on my desk a little pamphlet with the solemn headlines: "What if the Street Cars Go Broke?"

The average user of street car service would look at the headlines, sneer at the thought, and throw the book away. In other words, he does not care if the street car does go broke because he knows that street cars seem to go on just as they always do whether broke or not. You know that public utilities have no right to die or quit. But, if the careless user of street car service read every day, or every week, how much higher labor and materials were, and how much more it is costing them to live—just as himself—he would feel different about it.

If the telephone man made a threat about going broke, he probably would cause half of the town to think of going into the telephone business to succeed him. They all believe, and always will, that the telephone company is a gold mine. Some of us can imagine a sound basis for such a view because there has been a great deal of four-flushing.

If we would take a page in the local paper, and make a statement occasionally, just as a bank has to do, showing that we get four cents a day for a telephone with expenses around five cents, it would not take long to dispel the idea of telephone riches.

Just as a company strikes off a balance sheet to show the directors exactly what is going on, the company should strike off one and show the public what it is doing. It would not hurt your credit at the bank at all, and it ought to strengthen it if your banker has any red blood in him.

The banker is supposed to know how you are getting along, and it is foolish to think you are fooling him. Just as he has interest and principal coming, so have you interest and principal invested in the public, and at least you have interest coming. You are as strong as the banker.

Don't make the mistake of begging the public for a higher rate. Just inform them that the price will be higher and present reasons just as the spectacle trust did.

Telephone men don't get anything from Germany, but there are many things that they can't get any longer at a reasonable price because of Germany and her allies. The increasing cost of traffic is plain to every telephone man, and the possibility of strike and equivalent demand is at every door.

If your employes strike, it is because they have fallen below the natural requirements of their localized life, and cannot longer maintain themselves as others do. It only emphasizes the fact that the telephone man must be public spirited. He must give to charity. He must advertise. He must live—his employes must live, and his investors must live on a level with the locality.

Telephone men cannot pay themselves, their help, their investors, and take their part in the scale of living by giving telephone service a whole year at $13. No telephone company should cease to struggle for higher rates, as long as its rental earnings are in the 'teens.

If you are still unconvinced, break your glasses and get a new lens. Then step over to the candy store, stop at the haberdasher's for a collar, tarry at the dry goods store to get some sheets, and order some butter from the grocery store. If all this will not convince you to ask for a higher rate, you are hopeless.

MORAL: There is none so blind as those who will not see.

New House Organ of the Ohio State Telephone Co.

"Service—A Magazine for 'Ohio State' Folks" is the name of the new house organ of the Ohio State Telephone Co. which made its debut with the September issue—called the "organization number." It contains 20 pages of live reading matter and is written in a most interesting style. The cover, which is in colors, precents an exceedingly attractive appearance.

The leading article in this "organization number" is entitled "Getting Started to Keep Going," by President C. Y. McVey, in which he gives a general outline of the new company policy. The issue also contains messages from members of the new president's cabinet, including Vice-President F. R. Huntington, Commercial Superintendent and Treasurer H. B. Taylor, Secretary and Claim Agent W. L. Cary, Plant Superintendent B. H. Brooks, Auditor C. J. Queen, Purchasing Agent Harry C. Wagner and others.

The organization chart of the Ohio State company is reproduced and the functions of the various departments explained. "Service" is to be issued each month by the Ohio State company in the interests of its employes. It is under the editorship of P. L. Frailey who has put out some very clever publicity matter for the company.

Conservation of Gasoline Urged by Department of Interior.

After a careful investigation of the present gasoline situation, Van. H. Manning, director of the bureau of mines, of the department of the interior, has issued the following statement:

One-half of the gasoline used in the United States (1,250,000,000 gallons) is used in pleasure riding.

It is estimated that the United States army will need 350,000,000 gallons for aeroplanes, trucks, automobile tractors, and other machines. There is no way of obtaining this in this country except by saving from the existing supply, and this economy may be procured by voluntary cutting down of pleasure riding (for instance, the man who takes his family out on Sunday for a 50-mile ride can cut this in half).

It has been estimated that by economical use enough gasoline can be saved to supply not only the United States but also its allies for war purposes.

The following suggestions should be observed by automobile owners:

Do not allow your gasoline engine to run idle.

Use kerosene, not gasoline, for cleaning purposes in the garage.

See to it that the carburetor does not leak. Form the habit of shutting off the gasoline at the tank.

By judicious regulation of the mixture of gasoline and air in the motor both greater power and economy of fuel may be obtained.

Automobile owners need not lay up cars, but should use them either for trade or pleasure purposes thoughtfully and judiciously. If this advice is followed there will be no undue scarcity, for the United States possesses an abundant supply for ordinary purposes.

Employes of Mutual Telephone Co. of Erie Given Outing.

The Mutual Telephone Co., of Erie, Pa., recently entertained its employes at an outing at Waldameer. The day was divided so that all employes could attend and yet allow the company to give its patrons service. In the afternoon a dinner was served at 4:30 o'clock, after which many present returned to work so the day workers could go to the park. A second dinner was served at 6 o'clock. M. Victor Wright, branch superintendent, had charge of arrangements. The principal diversion was bathing during the afternoon.

"Telephony's" Home Study Course for Telephone Men

A Complete Presentation of the Principles Underlying Modern Telephony in All Its Branches—Arranged Systematically So That Regular Reading and Faithful Study Will Qualify Ambitious Men for Higher Positions—Prepared Under Supervision of Stanley R. Edwards—This Section Written by Jay G. Mitchell

Quiz Questions on the Preceding Installment.

776. What is the usual practice in handling local calls for "long-distance" as to ringing? Why is the condenser, 7, included in the circuit through the main winding of relay *A*?

777. Why is it necessary, in the circuit shown in Fig. 239, that the local operator be apprised when the toll recording operator answers the displayed trunk signal? Explain how the act of answering at any recording station will restore the associated trunk lamp signals to normal at all other recording positions.

778. Name one of the desirable features of operation in service toll trunk circuits. What is necessary in order that the toll operator may control the ringing of the local telephone connected to toll service trunk circuits of the repeating coil type?

779. Describe the operating routine for obtaining connection with a local line circuit when the trunk circuit shown in Fig. 239 is to be used. Describe the condition when the lamp, *F*, will not become bright in the course of making connection with a local line through the medium of the toll trunk circuit shown in Fig. 239.

780. What happens first when the toll operator operates her cord ringing key? Describe the function of the resistance, *I*. What is the first thing that happens when the local subscriber removes his telephone from the hook in answering the long-distance call?

781. Describe how the toll operator is apprised that the called local subscriber has answered.

CHAPTER XXVI. The Multiple Toll Switchboard (Continued).

782. *Restoration of circuit to normal.*—The removal of the toll cord plug carrying the connection in the toll switchboard trunk multiple and the trunk plug from the local multiple, releases all the trunk relays and restores the equipment to normal condition in readiness for another call. It is obvious that, in exchanges employing selective calling, the ringing current supplied to the upper armature of relay *E* in the circuit shown in Fig. 240, must be selected so that it will ring the bell of the proper local station.

This is usually accomplished by means of a party line ringing key which is connected to the associated trunk or else by a master key common to a group. In the latter case, the master key is set to

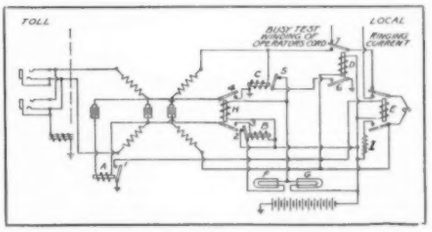


Fig. 240. 2-Wire Toll Service Trunk with Repeating Coil and Toll Switchboard Ringing Control.

provide the proper ringing current for one call and but one trunk of its associated group can, for that reason, be used at one time. Obviously, rapid operating will be attained only when each selective ringing key is connected with an individual trunk circuit.

783. *Toll trunk circuit arrangement of one operating company.*—The complete circuit arrangement to provide for every possible operating contingency in toll trunk service is probably still to be devised. One of the largest and most important operating companies, however, has adopted a circuit arrangement the principles of which are shown in Fig. 241.

The most casual examination of this circuit will disclose the fact that it conforms in general operation to the several desirable features for a toll service trunk. The toll operator controls the ringing of the local station and operating current for the local transmitter is supplied from the battery at the telephone office in which the called local line circuit terminates. As shown, the circuit is arranged for the three-wire multiple local common battery type of equipment illustrated, in principle, in Fig. 138, TELEPHONY'S Home Study Course for Telephone Men, Sections 354-356 inclusive, April 1, 1916.

784. *Method of operation.*—After the toll operator has asked for and obtained a trunk assignment as usual, the local operator tests the local line multiple to determine if the called line is engaged. At the same time, approximately, the toll operator connects with the multiple jack of the assigned trunk circuit in the toll switchboard multiple.

The insertion of the trunk plug in the local line multiple completes a path for a flow of current from the grounded terminal of the common exchange battery through the winding of the local line cut-off relay (not shown), the sleeve of the local multiple jack, the sleeve of the trunk plug, the winding of the trunk sleeve relay, *A*, and the trunk signal lamp, *H*, to the non-grounded terminal of the common battery, Fig. 241.

The operation of relay *A* disconnects the busy test winding of the operator's set coil and connects the trunk repeating coil, *L*, to the tip of the trunk plug. It also connects, at the spring contact, 5, the non-grounded terminal of the common battery to the ring side of the trunk *toward* the toll switchboard in series with one of the two windings of the relay, *B*, and one of the windings of the repeating coil. The grounded terminal of the common battery is already connected to the tip side of the trunk toward the toll switchboard through the other winding of the relay, *B*, and another winding of the repeating coil.

Should the cord used by the toll operator be provided with a relay connected between the tip and ring strands, the insertion of the toll cord plug into the trunk jack in the toll switchboard multiple would complete a path for the flow of current over the trunk circuit from the local office battery, through two of the four windings of the repeating coil, the two sides of the trunk circuit and the two windings of the trunk relay, *B*.

As a result of this flow of current over the trunk, relay *B* is energized, and by

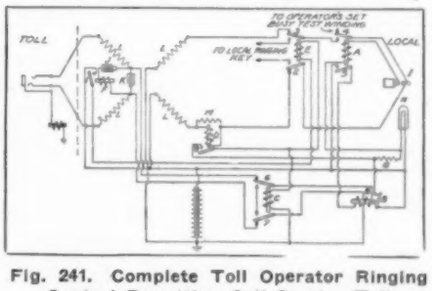


Fig. 241. Complete Toll Operator Ringing Control Repeating Coil Service Toll Trunk Circuit.

closing the normally-open spring contact, 8, the trunk lamp, *H*, is shunted by the comparatively low resistance, *G*. The darkening of the lamp, *H*, due to diverting a large proportion of its operating

current through the resistance, *G*, and contact 8, apprises the local switching operator that the trunk has been seized at the toll position.

At this stage in the operation the local switching operator has connected the trunk with the called local line, and the lighted and subsequently darkened lamp, *H*, has apprised her that the proper trunk has been seized at the toll switchboard position by the toll operator. The local called subscriber's multiple jack will now test busy to the other positions in the office and the toll operator may ring the local telephone at will.

785. *Ringing over the circuit.*—It is to be said that the local switching operator will operate the key for selecting ringing current associated with the trunk when she makes connection with the local line multiple so that the proper form of local ringing current is connected to the normally-open contacts of the relay, *E*. Whenever the relay, *E*, is energized, therefore, it will connect the previously-selected ringing current to the tip and ring of the trunk cord and through them to the two sides of the local called line.

When the toll operator is prepared to call the local telephone over the trunk, the ringing key of the toll cord circuit is operated, ringing current flows over the trunk and the two windings of the repeating coil through the condenser, *J*, and the winding of the relay, *F*. In the trunk circuit illustrated, the relay, *F*, is of the type shown in Fig. 123, TELEPHONY'S Home Study Course, Telephony, January 29, 1916.

The energization of relay *F*, resulting in the closing of its normally-open contact springs, completes a path for the flow of energizing current from the non-grounded terminal of the common exchange battery through the normally-open relay contact, 1 (now closed), the winding of the relay, *E*, and the winding of relay *C*, to the grounded terminal of the battery. The resulting operation of relay *E* disconnects the winding of the repeating coil from the trunk cord during the act of ringing and connects the previously-selected ringing current to the tip and ring of the trunk plug and through them to the local line.

The operation of the relay, *C*, during ringing, connects the two movable relay springs together, thereby maintaining a closed circuit through the two windings of relay *B*. The object in thus arranging for continuous energization of relay *B* after it has once been energized in the progress of the call, is to insure that the disconnect lamp, *H*, will not flash when the toll operator rings on the trunk.

Should relay *B* be released, the shunt around the lamp, *H*, would be removed by the opening of the circuit at "8" and the lamp would give a flash. It is to be remembered that the display of the lamp signal, *H*, at any time after it has once become dark, is a signal to the local switching operator to remove the connection.

When the receiver of the local called telephone is removed, the relay, *D*, is operated and completes a path for the continued flow of current from the non-grounded terminal of the common battery through the normally-open relay contact, 8 (now closed), the normally-open contact, 9 (now closed), and the winding of relay *C* to the grounded terminal of the common battery. The relay *C*, therefore, is operated whenever the toll operator rings on the trunk and also during the time the local receiver is off the hook. In either case, the flow of current out over the trunk to the toll switchboard is interrupted at relay contacts, 6 and 7, and the toll operator's supervisory lamp, as a result, is darkened.

Should the toll operator attempt to ring after the local telephone receiver has been removed from the hook, the relay, *F*, would be operated but the relay, *E*, would not be, due to the fact that the closed local contact of relay *D* substitutes the non-grounded terminal of the common battery for the grounded terminal obtained through the winding of relay *C*. Regardless of the condition of relay *F* therefore, relay *E* cannot be energized when relay *D* is holding the contact springs together.

786. *Restoration of circuit to normal.*—Upon the completion of the long distance conversation, relay *D* is released by the replacement of the local telephone receiver upon the hook. The resulting release of relay *C* again connects the two windings of relay *B* to the trunk, the supervisory signal of the toll cord is displayed and the connection at the toll switchboard multiple interrupts the current flow through the windings of relay *B*, causing the lamp, *H*, to be displayed by the removal of the shunt circuit around it, through contact 2. Upon the display of lamp *H*, the local operator removes the trunk plug from the local multiple and the equipment returns to normal condition in readiness for another call. The supply of operating current for the local telephone transmitter is derived from the common battery and flows through the windings of the repeating coil, *L*, in series with the supervisory relay, *D*.

It is obvious that an additional number of storage cells may be inserted in the wiring leading to the repeating coil in order to increase the strength of current flow through the local transmitter. In this way the transmission may be very readily boosted in the case of long distance connections. The battery, on the other hand, devoted to the local traffic may be left undisturbed at the standard voltage.

With this circuit, the lamp *H* is merely a disconnect lamp. It is not, strictly speaking, a supervisory lamp. When the lamp has once been darkened after being bright in the course of handling a call, no further indication is to be expected until the signal to disconnect is given. (*To be continued.*)

Save on Food.

In its September 11 issue the Official Bulletin, issued under the authority of the President of the United States, says: "Every publication and every person that aids in the daily work of reminding the American people of this duty (that of food economy) renders a true patriotic service."

TELEPHONY, therefore, reprints the following appeal from the Bulletin, entitled "The Food Pledge," and urges its readers to follow the advice contained therein:

"The food pledge is making its way very rapidly with the whole American people, but the terrible world emergency behind it has not yet come home to all of us. Living in a land which now has the largest remaining stock of food in the world, we are a little slow to realize that this stock can not possibly be our own to use as we see fit, but must be divided with countries where famine is a constant haunting specter. We live in the midst of plenty this year. But famine is just across the seas, and next year, or two years from now, it may be in our own land unless we can realize the full significance of food saving today and adjust our habits to provide for tomorrow.

Every provision of the food pledge, from wheat to soap fats, has been carefully thought out after detailed study of the world's supply of food today and its probable supplies for several years to come.

"Butter must be conserved because the world's stock of edible fats is rapidly diminishing and an increased production can not be secured except by organized effort in the dairy and allied industries extending over several years.

"Sugar must be conserved because there is a serious, immediate shortage.

"Every available medium for keeping the food pledge before every man, woman, and child in the United States must be used during the whole period of the war and even for a considerable period afterwards. For this problem of saving food is a responsibility put upon everyone every day. To the individual at the breakfast or dinner table it may seem one of the lesser duties of war. But in the mass it is one of our greatest and most immediate duties. Every publication and every person that aids in the daily work of reminding the American people of this duty renders a true patriotic service."

Ohio Convention Dates Fixed.

The 22nd annual convention of the Ohio Independent Telephone Association is scheduled to be held at Columbus, Ohio, November 22 and 23.

A Two-Reading Voltmeter Shunt

Inexpensive Device for Measuring Resistance and Locating Certain Kinds of Line Trouble from the Wire Chief's Desk—Method of Using Ordinary Shunt—Example of Use of Improved Form of Shunt for Trouble Location

By Edw. J. Creel

A voltmeter shunt is, in many ways, superior to a bridge, a mil-ammeter, or any other device for measuring the resistance of lines and locating certain kinds of line trouble. A shunt is also useful in various electric shops where a quick and fairly accurate method of determining resistance is required.

The ordinary shunt fails, however, in that its readings are in most cases little better than guesswork. This is true because the dry cells ordinarily used for the testing battery are anything but constant in the voltage which they supply for testing. A certain battery may, for instance, supply 30 volts for testing when it is operating through a resistance of 2,000 ohms. The same battery, if used to measure a resistance of say 15 ohms will supply perhaps 25 volts, thus causing an error of perhaps 400 or 500 per cent.

An improved form of voltmeter shunt was devised by the writer some eight or nine years ago. It has been in practical use ever since and no one who has used it would willingly go back to the old style shunt with its exasperating inaccuracy and uncertainty. With this shunt, resistances are read ordinarily within two or three per cent. of the correct value, merely by throwing two keys. Foreign battery on the line disturbs the shunt but little whereas a bridge, under like conditions, is practically helpless, and the galvanometer may easily be wrecked. This shunt is economical of testing battery, for a battery may still be used to give accurate measurements when it is supplying perhaps only a third of its original voltage, and when, with the ordinary shunt, it would have been discarded long before.

The ordinary voltmeter shunt circuit is shown in Fig. 1-*A*, in which *B* is a battery of 30 volts, *vm* is a voltmeter of 10,000 ohms, *s* is a shunt of 200 ohms, *vs* is a key for cutting the shunt into circuit in parallel with the voltmeter, and *R* is a resistance to be measured which may be assumed to have value of 15 ohms.

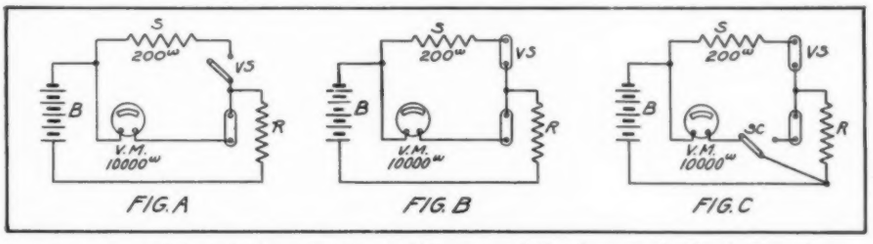


Fig. 1. Ordinary Voltmeter Shunt Circuits and the Improved Shunt Circuit.

As shown in Fig. 1-*A*, the shunt is out of circuit while the voltmeter and the resistance, *R*, are in series with the battery. Since the external resistance is negligible in comparison with the internal resistance of the voltmeter itself, the voltmeter registers practically 30 volts, that being the voltage supplied by the battery.

In order then to measure the resistance *R*, the *vs* key is thrown as in Fig. 1-*B*, thereby shunting the voltmeter with the 200-ohm shunt as shown. Suppose the voltmeter now registers 24 volts instead of 30 as before, then, consulting a chart prepared for that purpose, we find that a shunt reading of 24 indicates an external resistance of 48 ohms.

This result may instead be calculated as follows: The reading of 24 volts is the drop of potential across the shunt. Since the shunt is in parallel with the 10,000-ohm voltmeter, the effective resistance of that portion of the circuit is now 196 ohms. Since the battery is assumed to be furnishing 30 volts, the remaining six volts must be the drop which is taking place across the external resistance *R*. As the values of the two resistances are proportional to the drops across them, we find the value of *R* from the proportion 24 : 6 as 186 : *R*, from which *R* equals 49 ohms.

This computed result is correct providing the battery has maintained the voltage at 30 volts. Unfortunately, however, the voltage of the battery, which consists usually of dry cells, varies with every change in the resistance of the circuit and consequently the computed resistance may be far from the correct value.

In the improved shunt a second reading is taken by operating an added key, the scale key *sc* as shown in Fig. 1-*C*, thus connecting the voltmeter across the shunt and the external resistance in series. We thus find that the total drop across the shunt and the external resistance is perhaps 26 volts instead of the 30 volts as was assumed.

On the accompanying chart, we find a series of shunt readings which are indicated by the diagonal lines, a series of scale readings indicated by the vertical lines, and a series of resistances indicated by the horizontal lines.

On the left hand side of the chart

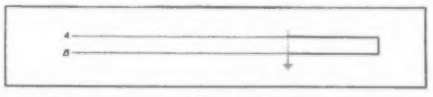


Fig. 2. One Side of Battery Pair.

then, we find a shunt reading of 24. Following this diagonal upward and to the right, we reach the vertical scale line 26. Then horizontally to the right we find the correct value of the resistance to be approximately 16.8 ohms instead of 49 as was indicated by the simple shunt arrangement. This value may easily be correct to within two per cent.

The use of this voltmeter shunt for the measurement of simple resistances is obvious enough but not every one understands its full possibilities in the location of line trouble. An actual instance where this shunt proved useful may be of interest. A case of trouble was reported in an outlying office one day. One side of a battery pair to a private branch exchange was grounded solidly in the cable and no vacant pairs were available to which the battery line might be cut.

A bridge not being at hand, the troubleman was directed to short the pair at his terminal which happened to be very close to the far end of the cable. Measuring out on the grounded wire, wire *B* of Fig. 2, the resistance to ground was found to be 160 ohms. Then measuring out on the good wire, *A*, through the short at the far end, and back to the trouble, the resistance to ground was found to be 190 ohms. The difference in the readings on the two sides is obviously due to the inclusion of the loop (shown in heavy lines) at the far end of the

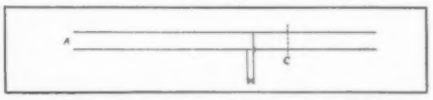


Fig. 3. Short-Circuited Cable Pair.

cable, in the reading taken on the good wire.

The loop resistance of No. 22 B. & S. gauge cable being approximately 31 feet to the ohm, it is seen that the trouble should be 31 times 30, or 930 feet towards the office from the point at which

the short was applied. Measuring back this distance, it was found that a rock had been blasted into the cable at that point. The measurement was accurate to within five feet. Had the readings on the two sides been the same, it is evident that the trouble would then have been either very close to, or else beyond, the point at which the short had been applied.

Considerable ingenuity may be exercised in applying some variation of this test to the different cases of trouble as they arise. Thus a short may be located as follows:

Suppose a pair is short-circuited in the cable, the central office being at *A*, Fig. 3, and the troubleman at *C*. If the troubleman shorts the pair at *C*, he decreases the trouble by a certain amount, say 20 ohms, which might indicate that the trouble was 620 feet beyond *C*. To test this point, the troubleman removes his short and then grounds one side of the pair at *C*.

If the troubleman now gets a difference of 20 ohms in the resistance to ground of the two sides of the shorted pair, the trouble may usually be assumed to be 620 feet beyond the point *C*. If, however, the difference in the resistance of the two sides to ground is found to be 40 ohms instead of 20, then we conclude that the trouble is out in a lateral which breaks off from the main cable 1,240 feet back towards the office from the point *C*, and that the trouble is located out in that lateral 1,240 feet away from the main cable. The manner in which these results may be deduced offers rather a pretty problem which the amateur troubleman may like to solve.

The fact that shorting the pair at *C* decreased the resistance of the short, indicated that the trouble was either beyond *C* or else that it was in a lateral which broke away from the main cable at some point between *C* and the office.

By grounding one side of the pair it was determined that the extra loop due to the short had a resistance of 40 ohms. If this 40 ohms had corresponded with the amount cut off the short by shorting the line at *C*, we would have concluded that the trouble was probably beyond *C*, the exception being that it might lie in a lateral which broke away so close to *C* that the difference in resistance could not be detected.

Since the two readings do not correspond, however, we conclude that the short lies off in a lateral between *C* and the office, in which case it must be 1,240 feet, 40-ohms' loop, from the main cable. Since this loop of 40 ohms has been cut exactly in half by shorting beyond it, it is evident that the loop resistance between *C* and the lateral in which the trouble lies must likewise be 40 ohms and that therefore that lateral must lie back 1,240 feet towards the office from the point *C*.

All this may be somewhat confusing to the beginner, but, if so, the trouble may be assumed to be at some other point than the one stated. Then it will be found that in some respect the new location fails to meet the conditions of the problem.

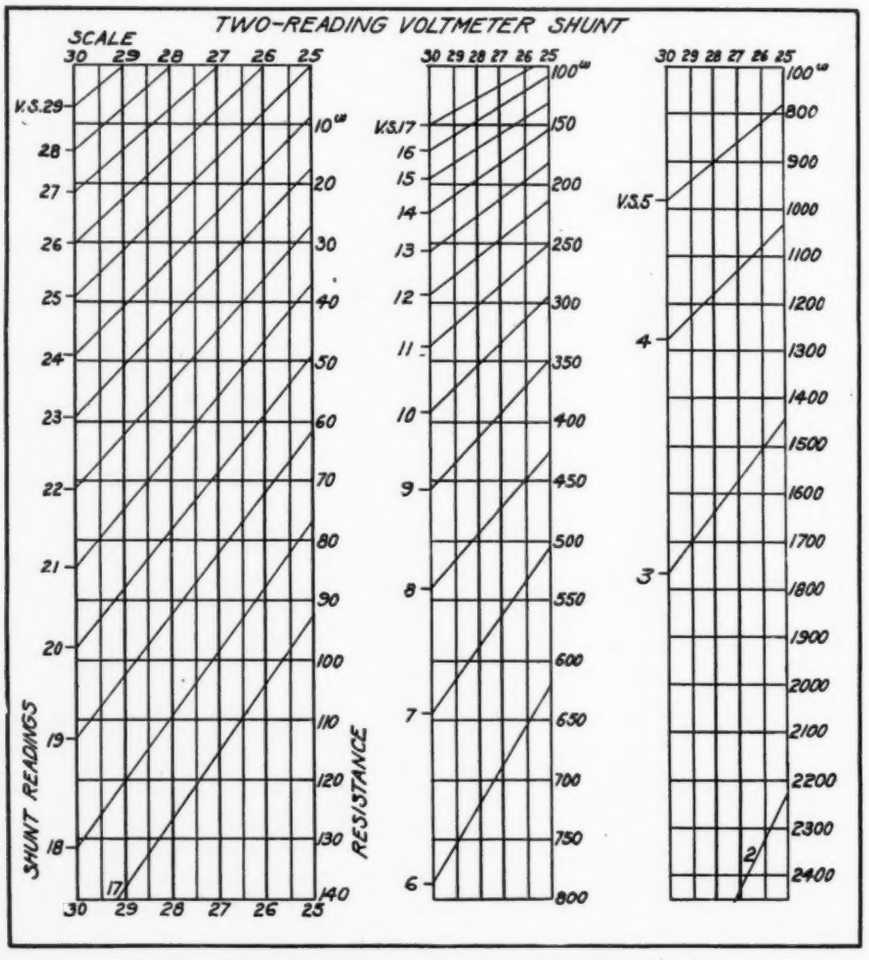


Chart for Use in Connection with Two-Reading Voltmeter Shunt.

Annual Report of the Kearney (Neb.) Telephone Co.

The Kearney (Neb.) Telephone Co., in its annual report for the year ending June 30, 1917, makes a showing of excellent growth, in spite of the fact that during the year it effected a purchase of the Bell property in that city and consolidated it with its own. It ends the year with nearly 400 telephones more than a year ago, and a financial record that is marred a little by reason of the unusual expenses of making a physical consolidation. Its report follows:

ASSETS.

Intangibles in plant account	$ 35,613
Real estate	2,311
Exchange central equipment	13,234
Exchange aerial equipment	74,830
Exchange subscribers' stations	28,968
Toll equipment	37,550
Utility equipment	4,264
Material and supplies	13,509
Cash on hand	426
Accounts receivable	2,760
Surplus	6,102
Junk	428
Prepaid insurance	163
Prepaid directories	128
Bond discount	3,120
Total	$223,406

LIABILITIES.

Capital stock, preferred	$ 50,000
Capital stock, common	89,650
Bonded debt	80,000
Accounts payable	2,582
Depreciation reserve	1,161
Interest due	12
Total	$223,406

EARNINGS.

From toll service	$ 7,143
From subscribers' service	32,481
Switching	1,239
Miscellaneous earnings	2,036
Total	$42,899

OPERATING EXPENSES.

Maintenance and depreciation	$ 13,503
Operative	8,809
General	9,891
Total	$32,213

The net operating income of $10,686 was distributed as follows: Interest, $4,460; taxes, $634; preferred stock dividends, $3,000; common stock dividends, $286 passed to surplus, $2,306.

The company has exchanges in Kearney, Riverdale and Sumner.

The Postponement of Conventions

Consensus of Opinion Among Prominent Telephone Men that Conventions Should Not Be Discouraged Owing to War Conditions—Answer to Inquiry of Chicago Chamber of Commerce on Advisability of Holding Conventions

Upon receiving a request from the Chicago Association of Commerce for reasons why conventions should or should not be held during the coming year, Secretary-Treasurer W. S. Vivian of the United States Independent Telephone Association sent out letters to the directors of the association, asking for an expression of their opinion in the matter. From the replies received the consensus of opinion appears to be that the holding of industrial conventions should be encouraged rather than discouraged at this time, but that conventions of a purely social nature should be dispensed with.

Walter J. Uhl, general manager of the Logansport (Ind.) Home Telephone Co., in his reply, expresses the opinion that industrial conventions should be encouraged and not discouraged, particularly those of the telephone industry.

"In the conduct of the war," Mr. Uhl states, "service furnished by all telephone companies would be of the greatest importance to the government, and they will be called upon to meet demands of the most urgent kind. Therefore, so far as possible, representatives of all telephone companies should meet in conventions and acquaint themselves with the prevailing conditions."

General Manager S. M. Heller of the Central Home Telephone & Telegraph Co., Louisville, Ky., believes that conventions which are purely social in their character could very well be dispensed with, but where the object of the meeting or convention is the betterment of business conditions, he is of the opinion that it should be held just as if there were no war. Mr. Heller states in part:

"It is going to be necessary for every business to produce more at less cost than heretofore. By holding these conventions of practical men who desire to learn more of their own business and more of the ways and means by which others in their business are overcoming the problems they have to face, we are doing just what our government wants us to do."

Vice-president F. B. MacKinnom of the United States Association is of the opinion that the association should favor the holding of trade conventions but not the holding of large fraternal and other conventions which always tax railroad facilities and undoubtedly at this time would be a burden on the railroads.

W. H. Bryant, vice-president and general manager of the Home Telephone Co., of Mobile, Ala., states, in his reply to Mr. Vivian's letter:

"It is my opinion that there is no reason why conventions should be suspended. This may be necessary later on, but I think that we are carrying out the policy as announced by the President when we let business go on in the usual way."

H. L. Gary, secretary and treasurer of the Theodore Gary Investment Co., Kansas City, Mo., feels that the American people should continue to do as they have been doing in so far that business in a general way will not be disturbed. He does not believe, however, that there should be any general conventions that necessitate an unnecessary movement of railroad equipment and the natural consumption of the fast diminishing surplus food supply.

President C. Y. McVey, of the Ohio State Telephone Co., Columbus, is of the opinion that the holding of conventions should be put on the most economical basis possible. "If by holding a business convention," he states, "the business represented is to be benefited enough to warrant the cost, then the convention should be held. If, on the other hand, the good derived from the holding of the convention will not outweigh the expense, then it should be discontinued."

Mr. McVey feels that all lodge and social conventions should be dispensed with and that those business organizations which are necessary to continue, should be operated as economically as possible.

Geo. R. Fuller, president of the Rochester (N. Y.) Telephone Co., is likewise of the opinion that conventions of a purely social nature should be discouraged, but by no means should the convention of the United States association be omitted. As telephone companies are required to be more efficient to successfully handle the increased traffic caused by war conditions, Mr. Fuller believes it is important that the telephone men be better informed and better prepared for meeting the demands—and this can only be accomplished by getting together in convention.

Hart F. Farwell, president of the Indiana Independent Telephone Association, is of the opinion that it is more necessary now than ever before that conventions and meetings be held, on account of the very great changes that are taking place in commercial matters.

P. C. Burns, president of the American Electric Co., of Chicago, is not in favor of holding a convention of Independent telephone companies this winter. His letter reads in part as follows:

"What trade problems have the manufacturers to discuss except the everlasting Bell factory menace, and what cooperation with the government can we discuss at the convention that cannot be discussed directly with the government?

We believe at least the making of any display on the part of the manufacturers should be cut out if a convention is to be held and the time and money lost by exhibiting should be conserved by the manufacturers and dealers."

Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision Over Telephone Companies—Decisions of Courts in Matters of Interest to Public Utilities and Actions of City Councils Relative to Franchises, Rates and Service

Commission's Order in Owatonna Case Upheld By Court.

Judge Childress of the Minnesota district court at Owatonna, Minn., on September 14, entered his order upon the appeal in the Owatonna case. This was the case wherein the Minnesota Railroad & Warehouse Commission, last February, ordered a physical connection between the toll lines of the Tri-State Telephone & Telegraph Co. and the local exchange of the Northwestern Telephone Exchange Co. at Owatonna. A differential of 10 cents was provided for on all toll calls over the Tri-State company's toll lines.

Judge Childress in his decision upholds that part of the commission's order which requires physical connection but reverses that part providing for the differential. The case will probably now be appealed to the Minnesota Supreme Court.

to the Supreme Court of Minnesota.

Nebraska Railroads Must Pay Same Rate as Other Patrons.

The Nebraska State Railway Commission ordered the abrogation of all contracts made by the Burlington Railroad Co. with numerous small telephone companies for service at its stations and depots, where such contracts were reciprocal in character and which called for lower rates than were the authorized business rates for the town.

The investigation of the commission disclosed that in a number of small towns the railroad company had refused to install telephones in its places of business unless the telephone company paid to have calls answered. The charges just cancelled each other. In other towns the company had contracts with local exchanges that antedated the establishment of the present schedule of rates. The commission held that these constituted discriminations and that as the state law requires railroad companies to maintain telephones in depots and stations, they could not avoid payment of the rated charges by requiring the telephone company to pay it for answering calls thereon.

In its correspondence with company officials it developed that the operating department was firmly of the opinion that the commission could not interfere in either case. Chairman Hall wrote to the Burlington legal department calling attention to the misapprehension of the law on the part of the operating department, and received the tart reply that the legal department agreed with the operating department that the furnishing of telephone service which was for the practically exclusive benefit of persons who desired to know about train schedules and goods shipments was no part of transportation service, but that it did not care to raise a row about it, and would acquiesce in the order.

The Nebraska commission is at a loss to understand upon what theory of law the railroad company proceeded in arriving at such a conclusion. The Missouri Pacific carried into all the courts it could an appeal from an order of the commission that it placed telephones in its depots and stations, as required by a law passed in 1909, and lost out in each court. After six years' legal battling and stalling it complied with the order.

Illinois State Association to Petition for 25-cent Discount.

The Illinois Independent Telephone Association is preparing a petition for presentation to the public utilities commission asking for an order authorizing all telephone companies not having a discount rate and making application therefor in this proceeding, to increase their present rates on business, residence and rural telephones 25 cents a month, on condition that this discount be given as a discount to the subscriber if the rental is paid on or before the 15th of the month.

A letter has been sent out by Secretary B. F. Baker of the Illinois association to its member companies calling attention to the petition which is being prepared by the association's general counsel and advising that each company so desiring may join in the application by having their officers sign a copy of the petition which is enclosed.

Police Commissioner Seeks to Stop Gambling by Telephone.

The Michigan Railroad Commission is considering, with the aid of the attorney-general's department, a peculiar request from Police Commissioner Couzens of Detroit.

Mr. Couzens wants an order issued to the Michigan State Telephone Co. compelling the abandonment of all private telephones by the company, where the subscriber, in Mr. Couzens' opinion, uses the telephone for gambling. It is the contention of the police head that gambling on races is being carried on in Detroit by means of the telephone, and he wants to stop it.

So far the commission has found no law which will give them authority to issue any such order, nor has the attorney-general's department.

Board of Equalization Raises Valuation on Wire.

The basis of assessment of telephone and telegraph companies has been raised by the Montana State Board of Equalization. The board decided to raise the rate for one copper wire from $85 a mile to $100 a mile. Each additional copper wire will be $25, the former basis of valuation. The valuation of each iron wire was raised, however, from $5 to $10 a mile.

Hotel Must Guarantee $5 Receipts from Telephone Booth.

The Nebraska State Railway Commission has ruled that unless hotel proprietors will guarantee receipts of $5 a month from long distance booths telephone companies will not be required to install them. The matter came before the commission on the complaint of the manager of the Wellman hotel at Niobrara that the Nebraska Telephone Co. declined to give him a booth, whereas it maintained and operated one in the rival hotel in the town. He insisted that this was a discrimination and that it resulted in the loss of patronage, since traveling men and other guests who desired to use the long distance lines passed up his hotel and patronized the other one.

The company retorted that it had a coin box telephone in the Wellman, and that the receipts therefrom averaged less than a dollar a month, whereas the booth in the rival hostelry gave up from $8 to $12 a month. The commission ruled that if the proprietor of the Wellman would guarantee $5 a month from a booth the company would have to install one. He refused, and the complaint was dismissed.

Summary of State Commission Hearings and Rulings.

ALABAMA.

November 13: Continued hearing in the case of the city commission of Birmingham vs. the Southern Bell Telephone & Telegraph Co., in which a reduction in rates in the city of Birmingham is asked.

MINNESOTA.

September 21: Hearing in the matter of the application of the Villard Telephone Co. for permission to increase its local exchange rates at Villard, Minn.

NEBRASKA.

September 17: Hearing on application of Dawson-Nemaha Telephone Co., of Dawson, Neb., for permission to publish new tariff increasing business and residence rates.

PENNSYLVANIA.

September 4: The commission granted a certificate of public convenience to the Bethel and Mt. Aetna Telephone & Telegraph Co. to take over and operate the Farmers' Telephone Co. of Reistville, Pa.

September 8: Notice filed by the Bell Telephone Co. of Pennsylvania that it has issued common stock to the amount of $4,000. This makes the total issue $60,000,000, $59,996,000 having been outstanding.

SOUTH DAKOTA.

September 25: Hearing relative to the right of the Dakota Central Telephone Co. to make an additional charge of 25 cents for telephone service in Watertown if the rental is not paid on or before the 15th of the succeeding month. The telephone company is ordered by the commission to show cause why the rate which was established by the board of arbitration, named by the city and the telephone company at the time of the granting of the new franchise, should be changed.

WEST VIRGINIA.

September 5: Application filed by the Shinnston Telephone Co., of Shinnston, for permission to increase its rates $2 per year for each class of service.

WISCONSIN.

September 17: Hearing at Boyd in the case of A. C. Vehrs et al., vs. Cadott Telephone Co., in regard to service. U-1148.

September 18: Hearing on application of Rudolph Telephone Co. for authority to increase rates. U-1084.

September 19: Hearing on application of Ontario & Wilton Telephone Co. for authority to increase rates. U-936.

September 20: Hearing in regard to investigation on motion of the commission of collection and payment for toll messages from the Soldier's Grove exchange and companies connected thereto, passing over the lines of the La Crosse Interurban Telephone Co. U-1145.

September 25: Hearing on application of Union Telephone Co. for authority to increase rates. U-1001.

September 26: Hearing on application of Reedsburg Telephone Co. for authority to increase rates. U-1069.

The Creation of the Telephone

History of the Invention and Early Development of the Telephone—Experimental Apparatus Used—Installation of First Commercial Exchange—Solving of Transmission Problems—Early Types of Commercial Telephone Sets

By C. E. Scribner

The Western Electric Mfg. Co., predecessor of the present Western Electric Co., was organized on April 2, 1872, consolidating the business of Gray & Barton with that of the Ottawa, Ill., instrument shop of the Western Union Telegraph Co., the latter being a one-third owner of the new corporation.

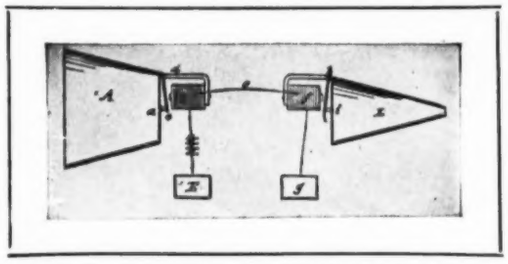


Fig. 1. Bell's Proposed Speaking Telephone.

The combined shop was located at 220 East Kinzie street, Chicago, and made electrical apparatus for the general trade in addition to the telegraph instruments and equipments required by the telegraph company.

At the Centennial Exposition in Philadelphia, in 1876, the Western Electric Mfg. Co., by that time the leading electrical manufacturing concern in the country, maintained the finest and most extensive exhibit of electrical appliances, and was awarded medals for the excellence of its galvanometers, insulators, electric bells, annunciators, fire alarms, Gray's printing telegraph, electric railway safety signals and Gray's electric harmonic telegraph.

On Sunday, June 25, 1876, there was demonstrated before the exposition judges an electric speaking telephone, thus bringing to public attention the invention which laid the foundation of the telephone industry and advanced the cause of civilization the world over. As the telephone later became the controlling factor in the business of the Western Electric Co., which in 1882 was chosen as the manufacturer for the Bell Telephone Co., the story of its invention and early developments assumes a prominent place in our narrative.

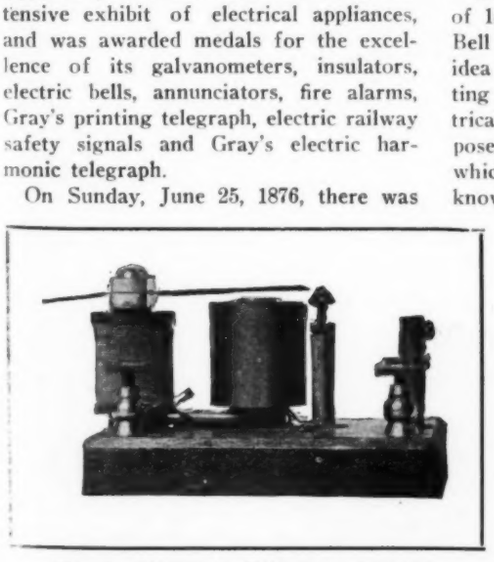


Fig. 2. Harmonic Telegraph Receiver.

The electric speaking telephone, demonstrated on that eventful Sunday at the Centennial Exposition, was the invention of Alexander Graham Bell, a young Scotchman who, in 1872, had located in Boston to teach his father's system of visible speech for deaf mutes. He also made a hobby of harmonic telegraphy on which he constantly experimented and for which he secured financial backing, the idea being to produce a system capable of sending several different tuned and therefore non-conflicting telegraph messages over a wire at one time.

In the summer of 1874 Professor Bell conceived the idea of transmitting speech electrically and at that time designed a proposed speaking telephone, the plan for which is shown in Fig. 1. This was known as the "Fig. 7" telephone because so designated in Bell's patent of March 7). His backers, however, discountenanced any waste of time on such a seemingly wild dream and insisted that he give his attention to the harmonic telegraph developments.

On the afternoon of June 2, 1875, however, while engaged on his harmonious telegraph experiments in the attic of the machine shop of Charles Williams, Jr., a prominent telegraph instrument manufacturer at 109 Court street, Boston, where all of his models were made, the principle on which he had based his proposed speaking telephone of 1874 was accidentally demonstrated to him.

Professor Bell was "tuning" some of his harmonic telegraph receivers (Fig. 2), to respond to the periods of pulsations of the corresponding sending instruments, which were connected together by wires in series with a battery. The pulsations were caused by make and break contacts on the vibrating reeds of the sending instruments.

Thomas A. Watson, a young mechanic whom Mr. Williams had assigned to Professor Bell's work and who was assisting in his experiments, was observing one of the instruments when the vibrating reed stuck fast.

Mr. Watson then plucked this reed or spring in an effort to loosen it and instantly Professor Bell in another room noticed the sympathetic vibration of the reed of the corresponding instrument and was amazed at hearing it give out a sound like the twang of a spring.

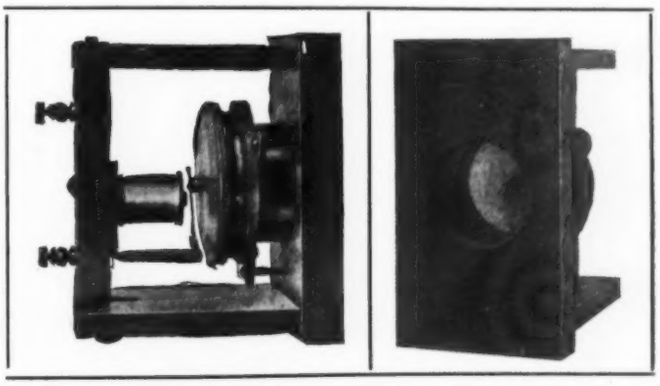


Fig. 3. Side and Front Views of "Gallows Frame" Telephone.

Upon noting just what Mr. Watson had done and having it repeated again and again, he realized that his harmonic telegraph instruments had actually transmitted and reproduced, electrically, the identical sound made by the balky spring. Undoubtedly other sounds could be reproduced with equal clearness, and he was convinced by the violence of these vibrations that the proposed speaking telephone he had designed in the summer of 1874 could be made to produce voice waves of sufficient power for practical transmission of speech.

He at once instructed Mr. Watson to make a speaking telephone along the lines of his invention of 1874, to consist of a modified harmonic telegraph receiver. It was to have its armature, or reed, hinged, and the moving end thereof attached to the center of a parchment diaphragm which was to take up the delicate sounds of the voice and transform them into

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electrical pulsations, thus transmitting speech electrically.

This first telephone model, which was made in record time by Mr. Watson, is now referred to as the "gallows frame"

Fig. 4. The Liquid Transmitter.

telephone. In Fig. 3 is reproduced a side view of this telephone, showing the hinged armature and parchment diaphragm; also a front view showing the mouthpiece opening. It did not transmit articulate speech satisfactorily but it did transmit many sounds which were easily reproduced by the harmonic telegraph receiver. This satisfied Professor Bell that he was on the right track, but a great many experimental models were made and tested before success crowned his efforts many months later.

In March, 1876, articulate speech was first telephoned. This was accomplished with a variable resistance transmitting instrument, which has been called the "liquid transmitter" (Fig. 4), to a receiving instrument of the harmonic telegraph type (Fig. 2), the message being sent in only one direction.

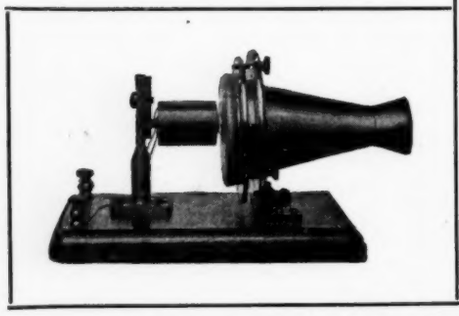
The speaking telephone instruments demonstrated before the judges at the Centennial Exposition in June, 18[illegible], as previously mentioned, were a single pole membrane transmitter (Fig. 5) and an iron box receiver with sheet iron diaphragm (Fig. 6). A liquid transmitter and a double pole membrane transmitter (Fig. 7) were also exhibited on that occasion.

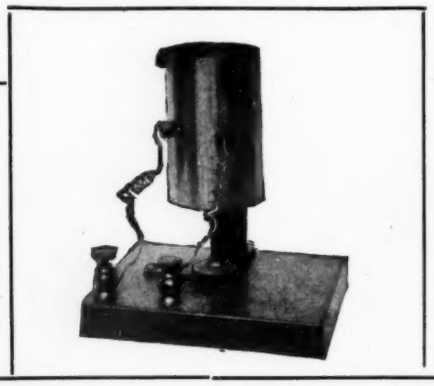
Following the Centennial Exposition the fame of the telephone spread rapidly. Professor Bell was besieged with requests for lectures and exhibitions, which required almost constant attention during the winter of 1876-1877.

A demonstrating instrument, with heavy permanent magnets and a large sheet-iron diaphragm, was designed for this purpose. This instrument was called Bell's lecture box telephone (Fig. 8), and was sufficiently powerful to be used both as transmitter and receiver. This telephone not only was a success in the lecture work, but it created a demand for telephones for commercial use. These telephones began to sell before any real business organization had been effected.

On April 4, 1877, the first private telephone line was completed and equipped with two of the box telephones. It ran between the office of Charles Williams, Jr., at 109 Court street, Boston, the birthplace of the telephone, and his residence in Somerville, a distance of about 2½ miles.

Since there was no signaling apparatus provided, attention at the distant end of the line was attracted by loud shouting or by thumping on the diaphragm with a lead pencil. Other lines were soon installed under these same conditions, but the use of pencils damaged the diaphragms and too often failed to gain a response.





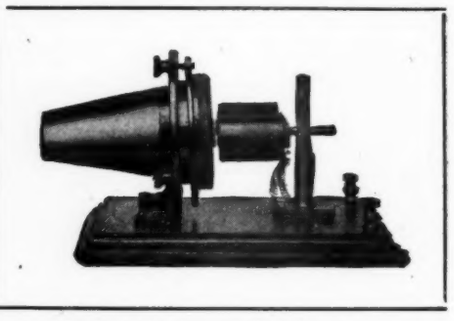


Fig. 5. Single Pole Membrane Telephone.—Fig. 6. Iron Box Receiver.—Fig. 7. Double Pole Membrane Telephone.

The first step in designing telephone signaling apparatus was Watson's "thumper" (Fig. 9), which consisted of a box telephone equipped with a hammer arranged to strike the edge of the diaphragm when a push button was operated. This transmitted louder thumping sounds over the lines than had been possible by the use of lead pencils and also obviated the damaging of the diagrams.

Numbers of these "thumper" equipped telephones were manufactured and sold, although it was recognized that the instrument was unnecessarily clumsy and the signaling far from satisfactory.

In May, 1877, Professor Bell and his associates decided to go ahead with the sale of telephones to the public and entered into an agreement whereby Charles Williams, Jr., became the manufacturer of the Bell instruments. Mr. Williams' equipment and facilities were probably, next to those of the Western Electric Co., the best in the country, and in a short time he was devoting all his energy to the task of meeting the rapidly increasing requirements. It was fortunate that this infant industry was able to secure such an able man and corps of skilled mechanics at the very beginning.

Although the telephone was still in the experimental stage, the public demand was very insistent, and instruments of the lecture box type, with slight modifications for greater compactness, were manufactured for a number of months.

In August, 1877, a wall telephone was devised by a change in construction of the box telephone. The pole pieces were placed at right angles to the magnet and the diaphragm and mouthpiece consequently faced toward the front of the box (Fig. 10).

These box wall telephones could be used both for transmitting and receiving, but were principally used for transmitting purposes in connection with separate hand telephones as receivers. These hand telephones were the result of a separate line of experiments, carried on in the spring of 1877, aimed at constructing a portable telephone, light of weight,

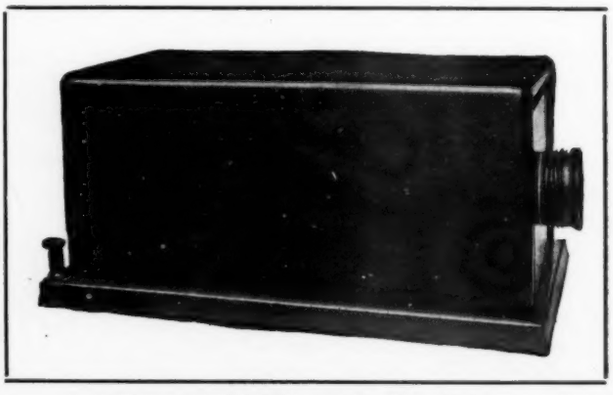


Fig. 8. Bell's Lecture Box Telephone.

convenient to hold to the ear and capable of perfect voice reproduction.

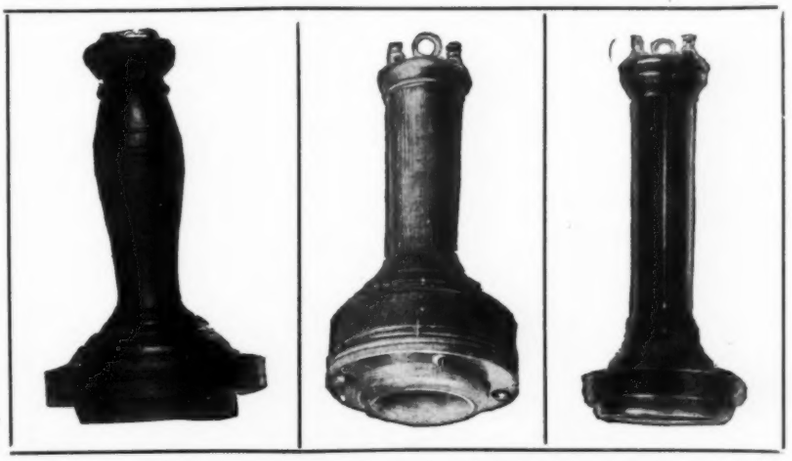
The first commercial hand telephone was made about May, 1877, and became popularly known as the "butter stamp" (Fig. 11). It consisted of a straight-bar permanent magnet placed inside of a wooden case or shell small enough to be easily held in the hand. It was many times smaller than the box telephone but surprisingly efficient, and so well designed that it was almost the equivalent in size and shape of the present-day receiver. Another model, produced in June, 1877, was an improvement on this instrument in minor details (Fig. 12) and other slight modifications followed.

The first rubber shell receivers were made in the fall of 1877, and the more perfected form with a screw cap (Fig. 13) was introduced in December of the same year. This receiver was widely known as the hard rubber hand telephone and, with slight modifications, was in general use until the advent of the present double pole receiver several years later.

In those days hand telephones were extensively used for both transmitting and receiving, but the preferred arrangement was the hand telephone for listening, using the more powerful box wall telephone as transmitter. However, while the hand telephone was an excellent receiver, none of these transmitters was powerful enough to give entire satisfaction under general commercial conditions and the need of radical improvement was recognized.

In July, 1877, there were approximately 230 Bell telephones in use throughout the country and on August 31, a little over two months later, this number had grown to 1,300, so great had been the demand for the new service. The installation of the first commercial telephone exchange was completed on January 28, 1878, at New Haven, Conn., the switchboard being equipped for eight subscribers' lines.

Fig. 10. First Commercial Wall Telephone.



Figs. 11 and 12. Wooden Hand Telephones.—Fig. 13. Hard Rubber Receiver.

Within one year the first multiple switchboard, the invention which, next to the telephone itself, made large exchanges possible, was being installed at Chicago.

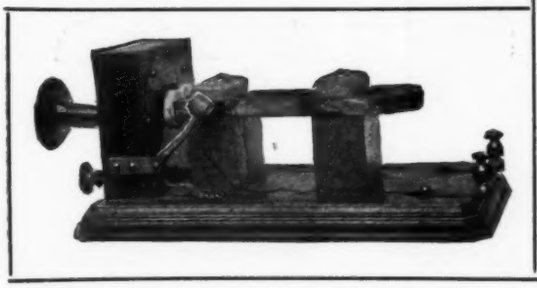
Elisha Gray, of Gray & Barton, had left the active service of the Western Electric Mfg. Co. in 1875 and had taken up work as an independent inventor. On February 14, 1876, he filed in the patent office at Washington a caveat, or notice of invention, on an electric speaking telephone. This was, by a remarkable coincidence, the day on which Alexander Graham Bell's speaking telephone patent application was filed and an interference therefore was declared by the patent examiner to determine which of the two inventors was entitled to the patent.

The proceedings which followed resulted in the awarding of the patent to Professor Bell, but Elisha Gray continued to promote telephones based on the rights he claimed. In this his financial backer, Dr. S. S. White, of Philadelphia, upheld him. However, Dr. White soon found the financial strain too heavy and urged the Western Union Telegraph Co. to take over the proposition.

The growth of the telephone business was so extremely rapid during 1877 that it was not strange that the Western Union company, with offices in nearly every community of importance in the United States and with employes well versed in electrical matters of that day, decided to take up the proposition and enter the telephone field on its own account.

Orders were at once given to the Western Electric Mfg. Co. to develop and make telephone instruments of the Gray design. A feature of the scheme was to use such strong electromagnets instead of permanent magnets as to excel the Bell telephones in power of transmission and thus furnish superior service.

On December 6, 1877, the American Speaking Telephone Co. was organized by the Western Union interests for the purpose of promoting the telephone business. It took over the Gray claims and



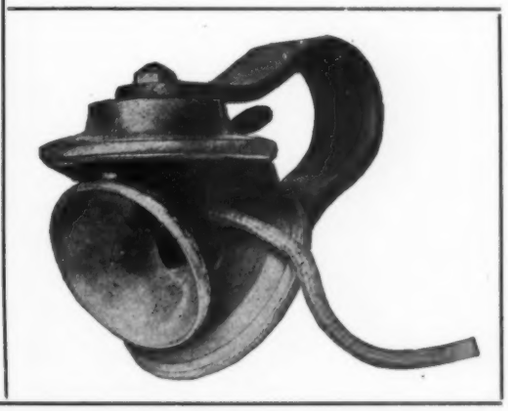
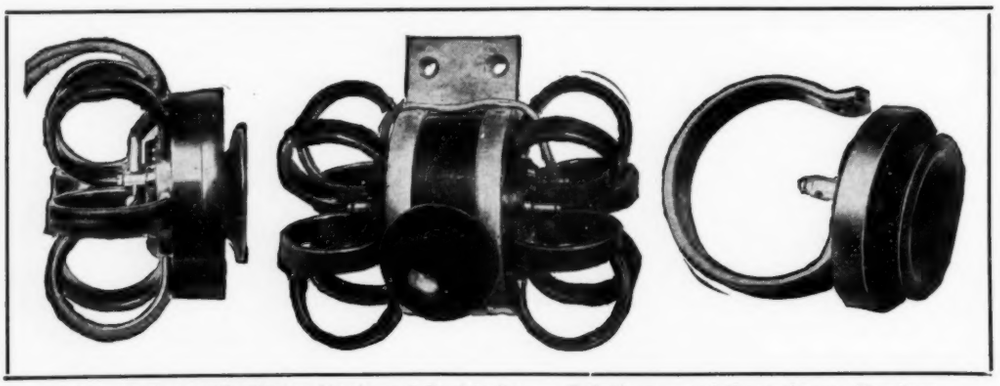


Fig. 9. Bell Box Telephone Equipped with "Thumper."—Fig. 14. Gray's Battery Telephone.—Fig. 15. Gray's Bi-Polar Receiver.



Figs. 16, 17 and 18. Phelps Single and Double Crown Telephones and Pony Crown Receiver.

other inventions on speaking telephone apparatus.

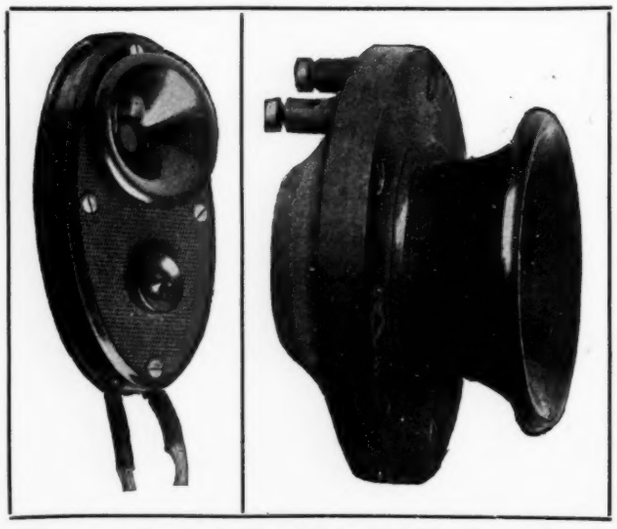
Early in 1878 the Gray battery telephone (Fig. 14), made by the Western Electric Mfg. Co., was put on the market. This instrument was first used both as transmitter and receiver. Later in the year the Gray bi-polar receiver, consisting of a permanent magnet with two diaphragms (Fig. 15), was developed. However, the Gray instruments were not sufficiently powerful to satisfy their promoters and strenuous efforts were made to further improve transmission.

While these events were taking place at Chicago, the New York shop of the Western Union Telegraph Co. had also been engaged in the development of magneto telephones for use by the Gold & Stock Telegraph Co., a New York subsidiary of the Western Union company, engaged in operating a telegraph exchange.

These instruments were of the magneto type, designed by George M. Phelps, Sr., superintendent of the New York shop. The Phelps single crown (Fig. 16) and Phelps double crown (Fig. 17) telephones were attempts to improve transmission by increasing the power of the permanent magnets, but the Phelps pony crown telephone (Fig. 18) with one heavy magnet proved equally satisfactory. The Phelps duplex, or "snuff box," telephone was designed both for transmitting and receiving (Fig. 19), but in practice the use of Phelps instruments settled down to the "snuff box" as a transmitter with the pony crown as receiver.

The Phelps instruments were not particularly satisfactory but they are interesting as examples of early commercial telephones, and because this New York shop, with its business in Phelps telephones and the manufacturing of the Western Union telegraphic instruments, was leased to the Western Electric Mfg. Co. on March 21, 1879, and became its Eastern factory.

On March 22, 1877, Thomas A. Edison, then prominent as an inventor of telegraph apparatus, had made a five-year contract with the Western Union Telegraph Co. to assign to that company all inventions produced by him capable of use on telegraph lines. The problem of developing an improved telephone transmitter was one of the first put up to Mr. Edison and resulted in the Edison carbon transmitter (Fig. 20), a variable resistance instrument which was used in conjunction with a local battery and induction coil. Transmitters of this design were made by the Western Electric Mfg. Co. and placed on the market in 1878.



Figs. 19 and 20. Duplex Telephone and Carbon Transmitter.

The Edison carbon transmitter was much more powerful than anything then available and gave the Western Union interests an immediate advantage.

At no time during this period were the Bell interests inactive. On the contrary, they made unceasing efforts to improve their apparatus and facilities for rendering efficient service, especially in the important matter of transmission.

In 1878 Thomas A. Watson developed a magneto generator (Fig. 21) and also a ringer or magneto bell (Fig. 22). These were assembled together with a hand-operated switch and necessary binding posts, in a wall set called "Williams' coffin" (Fig. 23). This hand-operated switch, used to disconnect the ringer during conversations, was quickly superseded by an automatic form of hook switch, the invention of H. L. Roosevelt, which depended for its operation on the weight of the receiver hanging on it when not in use.

The vitally important problem of improving transmission was solved for the Bell company in 1878 by the Blake transmitter (Fig. 24), the invention of Francis Blake, Jr. It was of the variable-resistance type like the Edison carbon transmitter and operated in a local battery and induction coil circuit, but was distinctly different in design and much more microphonic in quality.

While the first "Edison" instruments were being manufactured, the "Blake" instruments were also being prepared for the market. Thus the introduction of the Edison carbon transmitter, with its threat of ruin to the Bell interests, was almost immediately answered by the Blake transmitter. It saved the day for the Bell company and satisfactorily met the requirements of that time.

On September 12, 1878, the Bell company brought suit against a Western Union agent in Boston by the name of Peter A. Dowd, claiming infringement of the Bell patents. The real defendants in the case, however, were the Western Union Tele-

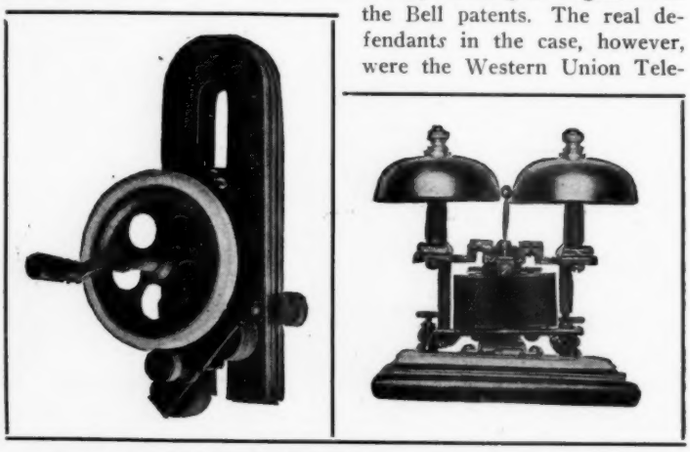


Fig. 21. First Magneto Generator.—Fig. 22. Magneto Ringer.

graph Co., the American Speaking Telephone Co., the Gold & Stock Telephone Co. and the Harmonic Telegraph Co.

Before this case came to trial, the Western Union interests had been advised by counsel that the Gray claims were not valid and that the Bell patents would undoubtedly be upheld, so they decided to settle the case out of court. On November 10, 1879, an agreement was signed by the terms of which the Western Union Telegraph Co. retired from the telephone field absolutely and transferred its existing telephone exchanges to the Bell company.

Following this peace treaty the telephone business exceeded all expectations. Further improvements were introduced and apparatus began to assume more permanent shape. The essential parts of a satisfactory telephone set, as shown in Fig. 25, were combined into a compact type of telephone (Fig. 26) by the adoption of a backboard at the top of which was mounted a box containing the generator, ringer and automatic switchhook with the receiver hanging on it. Below this was mounted the transmitter and at the bottom a battery box containing a single Leclanche cell for operating the transmitter. This type of set became the standard and was the telephone outfit most generally used for a period of several years.

In the meantime the Western Electric Mfg. Co. had, without Bell licenses and in the face of keen competition in the open field, developed and introduced switchboards along new lines which were considerably in advance of the other manufacturers of that day, also excellent ringers, generators and other accessory apparatus.

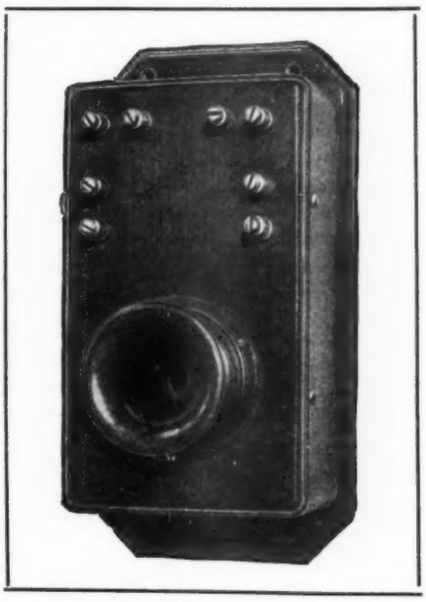


Fig. 24 Blake Transmitter.

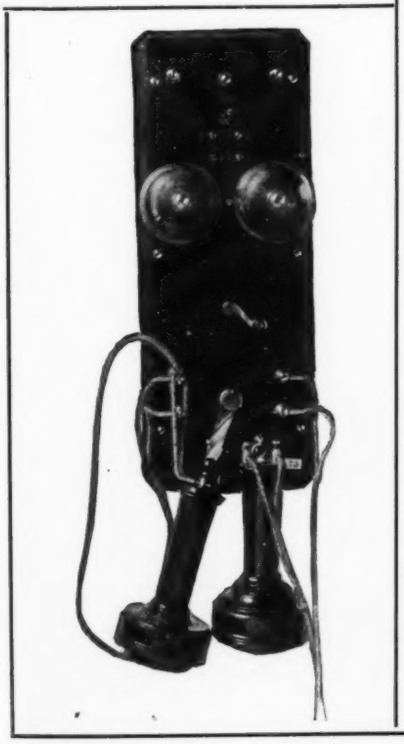
Telephone Service to Camp Zachary Taylor, Louisville, Ky.

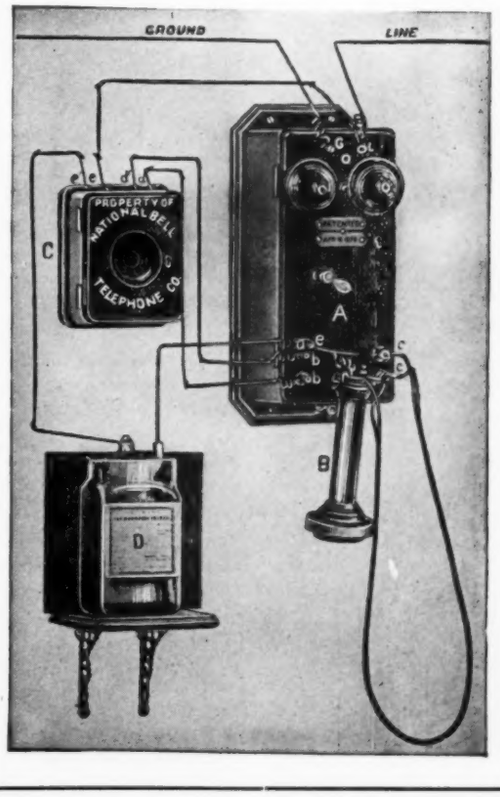
In connection with establishment at Camp Zachary Taylor, the army cantonment outside of Louisville, Ky., of a branch exchange with between 300 and 400 stations, the Cumberland Telephone & Telegraph Co. published in the Louisville newspapers a statement of the conditions under which service will be given. It is deemed impracticable to handle the service on a particular party basis and the service will, therefore, be handled just like local calls, except that there will be a five-cent charge for each message of five minutes or less from the camp to the city and for each message from the city to the camp.

When it was given out that a charge of five cents would be made for every call, the legal department of the city of Louisville immediately began an inquiry into the situation, on complaint of persons who pointed out what was declared to be a conflict in the arrangement and the terms of the contract by which a long drawn out litigation between the city and the Bell interests was concluded.

Clayton Blakey, city attorney, to whom the question was referred, explained that the agreement provides for free service from the city to residences inside a three-mile radius of the nearest city station and from the city to business institutions inside a three-mile radius. Mr. Blakey stated that the status of the camp would first have to be determined—whether it is a business institution or a residence.

The Cumberland manager, Keith Conway, however, states that the contract was made virtually at the direction of the government and that it is the same for all of the cantonments like the Louisville camp. He referred to the advertisement which stated: "It should be borne in mind that the telephone exchange at the camp is not a commercial extension of the Bell system. It has been established strictly for military purposes and will be conducted on a military basis without a view





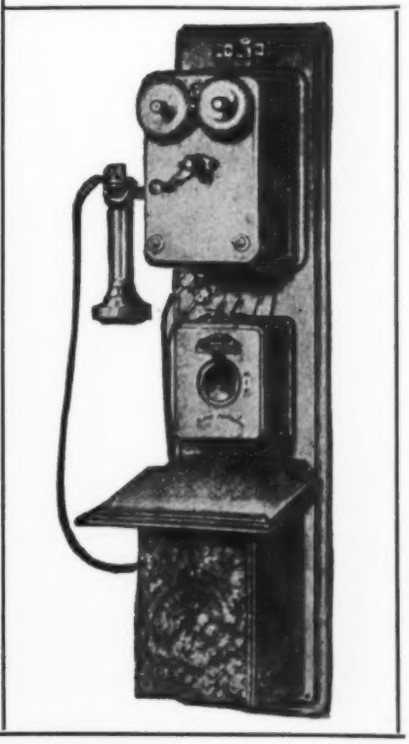


Fig. 23. First Wall Set with Magneto Generator and Ringer.—Fig. 25. Telephone Used in 1879.—Fig. 26. Compact Wall Set.

to profit-making. Whatever restrictions the government applies to the service will be in the interest of efficiency and conservation of time."

Of course, if the war department has given the instructions as to pay stations and charges, etc., the city administration will not attempt to require that the charges be abolished where Louisville-Cumberland subscribers are concerned, but the city will nevertheless make an inquiry to satisfy itself of the status of the whole proposition.

The Louisville Home will give the same service as the Cumberland to and from the camp, trunk lines of both companies entering the camp exchange, which, though installed by the Bell organization, is not a Bell property. Pay stations and similar toll charges will be made by the Louisville Home.

History of the Southwestern Bell Telephone System.

Some interesting facts are given in a recent issue of the New York Commercial relative to the history of the Southwestern Bell Telephone System. After some early development there were formed four companies now grouped into one operating organization. These companies and their fields of operation were:

Bell Telephone Co. of Missouri, operating only in St. Louis and the immediate vicinity; Missouri & Kansas Telephone Co. operating in all of the state of Missouri not covered by the Bell Telephone Co. of Missouri, and in the state of Kansas; Pioneer Telephone & Telegraph Co., operating throughout the state of Oklahoma, and the Southwestern Telegraph & Telephone Co., operating throughout the states of Texas and Arkansas, with the exception of the extreme western sections contiguous to El Paso.

In the early part of 1912 these four companies were grouped and called the Southwestern Bell Telephone System. A short time later the name of the Bell Telephone Co. of Missouri was changed to the Southwestern Telegraph & Telephone Co. (Mo.) and the territory operated was extended to include approximately the eastern half of Missouri. On January 1, 1917, the name of the Missouri & Kansas Telephone Co. was changed to Southwestern Bell Telephone Co. and that company acquired, and has since operated all the property owned by the Southwestern Telegraph & Telephone Co. (Mo.) and the Arkansas property of the Southwestern Telegraph & Telephone Co. formerly operating in both Arkansas and Texas.

The companies now forming the Southwestern Bell Telephone System are: Southwestern Bell Telephone Co., Pioneer Telegraph & Telephone Co., and the Southwestern Telegraph & Telephone Co. Each of these companies has its board of directors and officials and the following officials are common for all three companies: Chairman of board of directors, C. S. Gleed; President, H. J. Pettengill; first vice-president, and treasurer, E. D. Nims; second vice-president, Ben S. Read; general counsel, D. A. Frank; general auditor, J. K. Waas; secretary, J. P. Crowley. For each operating division there is a general manager, reporting to the second vice-president, who is in charge of operations.

District Meetings to Be Held in Ohio During October.

The Ohio Independent Telephone Association has completed arrangements for holding six district meetings in various sections of the state during the first two weeks in October. The meetings are scheduled as follows:

District No. 1, comprising Ashtabula, Cuyahoga, Erie, Geauga, Huron, Lake, Lorain, Medina and Trumbull counties, will meet October 2 in the Electric building at Cleveland. Frank A. Knapp, of Bellevue, is vice-president, and C. M. Grauel, of Painesville, secretary of this district.

District No. 8, comprising Defiance, Fulton, Henry, Lucas, Ottawa, Sandusky, Seneca, Williams and Wood counties, will meet October 3 at Hotel Secor, Toledo. Geo. A. Ford, of Toledo, is vice-president and A. W. White, of Bryan, secretary of this district.

District No. 7, comprising Allen, Auglaize, Hancock, Hardin, Mercer, Putnam, Paulding, VanWert and Wyandot counties, will convene October 4 at the Elks Home, Lima. The vice-president of this district is Geo. H. Metheany, of Lima, and the secretary is G. W. Vernor, of Findlay.

Districts Nos. 5 and 6, comprising Champaign, Clark, Darke, Greene, Logan, Madison, Miami, Montgomery, Shelby, Brown, Butler, Clermont, Hamilton, Preble and Warren counties, will hold a joint meeting in the Ohio State Telephone building at Dayton, October 5. Conrad Kipp, of Greenville, is vice-president, and L. A. Miller, of Darrtown, secretary.

District No. 2, comprising Carroll, Columbiana, Harrison, Jefferson, Mahoning, Portage, Stark, Summit and Tuscarawas counties, will meet on October 10 at the Courtland Hotel, Canton. W. B. Gregson, of New Philadelphia, is vice-president, and C. H. Swift, of Alliance, secretary.

Districts Nos. 3, 4 and 9, comprising Athens, Belmont, Coshocton, Gallia, Guernsey, Meigs, Monroe, Morgan, Muskingum, Noble, Perry, Washington, Adams, Clinton, Fayette, Highland, Jackson, Lawrence, Pickaway, Pike, Ross, Scioto, Vinton, Ashland, Crawford, Delaware, Fairfield, Franklin, Holmes, Hocking, Knox, Licking, Morrow, Marion, Richland, Union and Wayne counties, will hold a joint meeting at the Hartman Hotel, Columbus, on October 12. J. B. Rhodes, of Zanesville, is vice-president, and W. H. Bowron, secretary, of the third district; H. P. Folsom, of Circleville, is vice-president, and H. M. Elliott, of Chillicothe, secretary of the fourth district; G. R. Johnston, of Columbus, is vice-president, and C. E. Hollander, of Newark, is secretary of the ninth district.

All Independent telephone men in the state are urged to make a special effort to attend and take part in the meetings, not only in their own district, but others if possible.

In a letter sent out to Independent telephone men, calling attention to the district meetings, President Frank L. Beam, of the Ohio association, states:

"Present conditions demand a thorough discussion of the many phases of the telephone business, which are of vital interest to the general public, stockholders and every department of telephone organization.

The freedom of discussion and expression of new ideas has always made these district meetings most beneficial, and at no time since our organization have we been confronted with so many problems to be solved, in order to efficiently maintain our service and property, and to safely protect the investment of our stockholders.

With practically the whole world at war, many additional burdens have come upon the telephone companies. The cost of all materials is constantly increasing; it is necessary to pay increased wages in practically all departments, and with this the legislature has restricted the working hours for operators.

We are affected by national legislation, the selective draft has taken many of our telephone men, in addition to two wire companies for the reserve signal corps, central division, organized entirely from Independent telephone men of Ohio.

The telephone companies will have to pay their proportion of the war tax bill. Traffic on all classes of service is constantly increasing. This seems to be an opportune time for a thorough discussion of many important questions together with their relation to economic management and proper rates.

Every company should see to it that it is well represented. The only way to get the real benefit from these district meetings is to have as many departments of your organization represented as possible, to absorb and carry home the information, new ideas, enthusiasm and incentive for better work and service, which always manifests itself at these district meetings."

Fundamental Principles of the Telephone Business

A Reading Course Designed to Present Logically the Principles Which Underlie Successful Organization and Operation of Telephone Properties—Prepared Under the General Supervision of Stanley R. Edwards—This Section, "Part VI, The Valuation of Telephone Properties," Written by Chas. W. McKay

Quiz Questions on the Preceding Installment.

278. What three items must be considered in setting up a reserve fund for the replacement of any individual item of plant?

279. What method is used to determine the amount in dollars which should be set aside each year to replace the plant at the end of its useful life?

280. Outline the method for building up a composite annual rate of depreciation.

281. Give an explanation of why a fair life of 12 years is taken as the average life of the exchange pole lines listed in Table XXXVIII. Discuss the salvage value of poles and the yearly depreciation rate as regards the average life and zero salvage values.

282. What kind of depreciation has an effect upon the average life of the exchange distribution wire?

CHAPTER XVIII. Depreciation (Continued).

283. *Salvage and Depreciation of Exchange Distribution Wire.*—It will be noted that the exchange distribution wire, or drop wire (Table No. XXXVIII), is given a zero salvage value. This means that the company estimates that sufficient return will be derived from the drop wire as a whole to about offset the cost of removals. In other words, allowance is made for the recovery of a part of the drop wire in a condition permitting reuse.

The annual depreciation rate percentages vary from 15.4 to 20.0, an average of 16.5 per cent. for the three states (Table No. XXXVIII). The engineering department has raised this average slightly—to 16.6.

In considering the figures given in Table No. XXXVIII for exchange distribution wire, and for that matter for all of the other items, it should be remembered that while they represent a careful analysis of the conditions met with by one company operating in the Middle West, they may not be applicable to the individual requirements of all of the readers of this article. Each case, of course, should be carefully analyzed by itself.

284. *Exchange Bare Wire.*—The exchange bare wire—and by bare wire is meant the uninsulated wire as found on the distribution pole lines—is given a life ranging from 6.5 years in State A to 8.7 years in State C, an average for the three states of 7.1. It will be noted that the engineers have raised the average life of the three states to 8.0. Evidently little or no copper wire is used by the company under consideration, otherwise both life and salvage value would be appreciably higher. Copper wire, of course, has a very high salvage value.

In the case of the exchange bare wire, functional depreciation again plays an important part. Obviously the life of bare iron wire, if affected only by physical depreciation, is considerably over eight years. The writer recently appraised a telephone plant where the major portion of the bare iron wire had been in service 12 years and was found to be in good condition, in fact in such good condition that it will probably last four or five years longer. However, in this case an excellent grade of galvanized wire had been used and the climatic conditions had not been unusually severe.

285. *Salvage Value of Bare Iron Wire.*—Obviously, bare iron wire has no salvage value. Of course there may be isolated cases where iron wire is removed

Type of Plant.	Life in Years					Net Salvage—Per Cent. of First Cost.					Yearly Depreciation—Per Cent.				
	State A.	State B.	State C.	Composite, Three States.	Allowance Made by Chief Engr.	State A.	State B.	State C.	Composite, Three States.	Allowance Made by Chief Engr.	State A.	State B.	State C.	Composite, Three States.	Allowance Made by Chief Engr.
Exchange pole line	10.0	12.0	10.0	10.4	12.0	0	0	0	0	0	10.0	8.3	10.0	9.6	8.3
Exchange distributing wire	6.5	5.0	6.3	6.1	6.0	0	0	0	0	0	15.4	20.0	16.0	16.5	16.6
Exchange bare wire	6.5	7.0	8.7	7.1	8.0	—16.0	—15.0	— 5.7	—13.0	—15.0	17.8	16.5	12.2	15.9	14.4
Exchange wire composite	6.5	6.3	7.4	6.7	7.2	— 9.4	—10.7	— 3.2	— 8.0	— 9.2	16.8	17.5	13.9	16.2	15.2
Exchange aerial cable	12.0	12.0	12.0	12.0	12.0	30.0	20.0	33.0	28.0	28.0	5.8	6.7	5.6	6.0	6.0
Exchange U. G. main cable	20.0	20.0	16.0	18.2	20.0	40.0	35.0	38.0	38.0	38.0	3.0	3.2	3.9	3.4	3.1
Exchange subs. cable	13.0	15.0	10.0	12.2	13.0	25.0	30.0	30.0	28.1	28.0	5.8	4.7	7.0	5.9	5.5
Exchange U. G. cable composite	23.6	18.3	13.6	16.1	17.4	36.2	33.8	36.0	35.5	35.5	2.7	3.6	4.7	4.0	3.7
Exchange U. G. main conduit	45.0	45.0	50.0	47.6	45.0	0	0	0	0	0	2.2	2.2	2.0	2.1	2.2
Exchange subs. conduit	15.0	20.0	15.0	16.1	16.0	0	0	0	0	0	6.7	5.0	6.7	6.2	6.2
Exchange conduit composite	37.0	40.0	38.5	38.5	37.0	0	0	0	0	0	2.7	2.5	2.6	2.6	2.7
Exchange submarine cable	10.0	....	....	10.0	10.0	0	....	....	0	0	10.0	....	....	10.0	10.0
Exchange right of way	20.0	15.0	20.0	18.2	18.0	0	0	0	0	0	5.0	6.7	5.0	5.5	5.6
Exchange land	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Exchange flameproof buildings	....	....	24.0	....	....	....	....	35.0	....	....	....	....	2.7	....	....
Exchange non-flameproof buildings	....	....	15.0	....	....	....	....	35.0	....	....	....	....	4.3	....	....
Exchange buildings composite	20.0	20.0	22.4	20.3	20.0	50.0	30.0	35.0	41.0	40.0	2.5	3.5	2.9	2.9	3.0
Exchange C. O. equipment	9.0	8.0	10.0	9.1	10.0	20.0	20.0	15.0	18.3	20.0	8.9	10.0	8.5	9.1	8.0
Exchange S. S. E. apparatus	9.0	5.0	9.0	7.4	8.0	10.0	10.0	12.0	10.6	10.0	10.0	18.0	9.8	12.1	11.2
Exchange S. S. E. installation	9.0	10.0	7.0	8.6	7.0	0	0	0	0	0	11.1	10.0	14.3	11.7	14.3
Exchange station equipment composite	9.0	6.0	8.2	7.7	7.7	7.0	7.0	8.4	7.4	7.0	10.3	15.6	11.1	12.0	12.1
Toll poles	16.0	16.0	15.0	15.6	16.0	0	0	0	0	0	6.3	6.3	6.7	6.4	6.2
Toll aerial cable	12.0	10.0	13.0	10.8	12.0	30.0	10.0	25.0	19.8	28.0	5.8	9.0	5.8	7.4	6.0
Toll copper wire	30.0	28.0	30.0	28.9	30.0	35.0	35.0	40.0	36.4	35.0	2.2	2.3	2.0	2.2	2.2
Toll iron wire	10.0	12.0	10.0	10.6	10.0	—19.0	—20.0	0	—14.3	—15.0	11.9	10.0	10.0	10.8	11.5
Toll wire composite	20.6	23.4	23.0	22.2	22.1	27.8	29.9	35.8	31.3	29.4	3.5	3.0	2.8	3.1	3.2
Toll conduit	45.0	45.0	50.0	47.6	45.0	0	0	0	0	0	2.2	2.3	2.0	2.1	2.2
Toll U. G. cable	20.0	25.0	20.0	21.0	20.0	40.0	35.0	40.0	38.6	38.0	3.0	2.6	3.0	2.9	3.1
Toll submarine cable	10.0	10.0	....	10.0	10.0	0	0	....	0	0	10.0	10.0	....	10.0	10.0
Toll right of way	25.0	30.0	25.0	27.0	30.0	0	0	0	0	0	4.0	3.3	4.0	3.7	3.3

Table XXXVIII. Determination of the Annual Depreciation for Company in Middle West.

from functional causes shortly after its installation and a part of it re-used. Cases of this kind are exceptional, however, due to the high cost of removing and rehandling bare iron wire.

It will be noted that a negative salvage value has been assigned to the iron wire. This negative salvage value represents the cost—expressed in terms of the original, or reproduction, cost—of removing the wire. In other words, iron wire which has lived its useful life is a liability to an operating telephone company rather than an asset. The negative salvage values range from 16.0 to 5.7, an average for the three states of 13.0. The engineers have allowed a negative salvage value of 15.0. This, in the author's opinion, is a little high as the cost of removing bare iron wire usually ranges from 10 to 13 per cent. of the first cost in service.

The annual rate of depreciation ranges from 12.2 to 17.8, an average of 15.9 for the three states. The engineers have reduced this average to 14.4.

286. *Exchange Iron Wire, Composite*—For convenience in considering the wire plant as a whole, the company under consideration has included in its table an analysis of the annual depreciation of the composite wire plant, including both line wire and drop wire. The average figures for the three states are:

Life, 6.7 years; net salvage value minus 8.0 per cent. of the first cost; and yearly depreciation in per cent., 16.2.

The corresponding allowances made by the engineering department are 7.2, minus 9.2, and 15.2, respectively.

287. *Functional Depreciation of Exchange Aerial Cable.*—It is interesting to note that the conferees were unanimous in selecting 12 years as the average life for exchange aerial cable. The term aerial cable, as here used, includes not only the cable proper but also messenger strand, terminal boxes, pole sites and the bridle wire.

Obviously, if the aerial cable only were considered, it would have an average life, if influenced by physical depreciation alone, of appreciably more than 12 years. In some instances, aerial cable installations have been known to last 20 or 25 years. However, the inclusion of the aerial cable auxiliary equipment tends to materially shorten the average life, as does also the consideration of functional depreciation. We have all known of cases where aerial cables, in perfect condition, have been removed two or three years after their original installation. This may be due to the passage of municipal ordinances requiring the removal of the overhead type of distribution from specific streets or due to rapid subscriber growth, necessitating the construction of an underground cable plant, and due to other causes.

An excellent illustration of the effect of functional depreciation upon the life of aerial cable is to be found in the history of the New York Telephone Co. About ten years ago this company built extensive aerial cable distribution systems in several of the outlying sections of the borough of Brooklyn. Shortly thereafter the city fathers passed ordinances creating restricted areas and ordered the removal of all electric light and telephone poles from the city streets.

In another section of the same borough an extensive aerial cable distribution system had to be junked within two years after its original installation due to the extraordinarily rapid subscriber growth. The rumor of a proposed extension of a rapid transit subway system into this section of the city caused an unprecedented building development and the telephone company found it necessary to provide from 300 to 600 cable pairs per block in a territory where from 25 to 50 pairs per block had previously sufficed.

288. *Salvage Value and Depreciation Rate of Exchange Aerial Cable.*—The salvage value in per cent. of the first cost ranges from 20.0 in State B to 33.0 in State C, an average for the three states of 28.0. This latter figure was adopted by the engineers.

A net salvage value of 28 per cent. of the first cost installation is certainly conservative. As a rule, it will be found that the salvage value ranges from 30 to 33 per cent.

The average annual depreciation rate for the three states was 6 per cent., and this figure was accepted by the staff of the chief engineer.

289. *Exchange Underground Main Cable.*—By exchange underground main cable is meant the cable in the main conduit lines. The life as given in the table ranges from 16 years to 20 years—an average of 18.2 years for the three states. Twenty years has been adopted by the engineering force. An average life of 20 years is conservative for a company of the size of the one under consideration. In the smaller plants, underground cables frequently have an active life of over 25 years.

The factor of functional depreciation does not play as large a part in the case of main underground cable as it does in the case of the items previously discussed. However, most of the larger companies often have occasion to retire underground cables from service due to the fact that they have become inadequate to care for the needs of the territory served.

The salvage value of 38 per cent. of the reproduction cost, or cost new, seems reasonable, although there is ample precedent for a salvage allowance as high as 40 per cent. The annual rate of depreciation as given in Table No. XXXVIII ranges from 3.0 to 3.9, or an average of 3.4 per cent. for the three states. It will be noted that the engineering department has reduced this figure to 3.1.

290. *Exchange Subsidiary Cable.*—Subsidiary cable, or lateral cable as it is more often called, is given an average life of 12.2 years. The engineering department has increased this life to 13 years. It will be noted that the average life allowed by the engineering department for subsidiary cable is 7 years less than that allotted to the main underground cable. The reason for this will be apparent.

Subsidiary cables, while they have about the same life from physical causes as main underground cable, frequently have to be removed from service long before they have become defective, due to functional causes. Changes in distribution requirements often necessitate the abandonment of laterals to street poles in favor of subsidiaries built to the interior of city blocks. Again, changes in street grades and alterations in electric light conduit lines, water mains, etc., may necessitate the redistribution of a telephone company's lateral cable facilities.

The salvage value allotted to subsidiary cable by the engineering department—28 per cent. of the first cost—seems a little low. The fact that it is 10 per cent. lower than the salvage value assigned to the main underground cable is probably due to an attempt to make allowance for the occasional abandonment of subsidiary or lateral cables. Most operating companies experience cases of this kind. It sometimes happens that a lateral cable placed in a small bore subsidiary duct becomes "frozen" to the duct—and has to be abandoned entirely.

The average annual depreciation rate for subsidiary cable is given as 5.9, and this allowance has been reduced to 5.5 by the engineering department.

(To be continued.)

Annual Meeting of Michigan Traffic Association.

The Michigan Independent Telephone & Traffic Association at its annual meeting held recently in Grand Rapids, Mich., elected directors for the ensuing year as follows: C. E. Tarte, A. E. Wells, C. E. Smith and F. V. Newman, Grand Rapids; W. J. Melchers and L. L. Conn, Owosso; W. A. Bahlke, Alma; R. C. Smith, Holland; Thomas Bromley, Jr., Muskegon; N. F. Wing, Grass Lake; W. B. Serviss, Saginaw; J. P. Gibbs, Ithaca; C. G. Fitzsimmons, Reading; A. H. McMillan, Bay City, and G. L. Hall, Dowagiac.

The old officers were re-elected as follows: C. E. Tarte, Grand Rapids, president; W. J. Melchers, Owosso, vice president, and F. V. Newman, Grand Rapids, secretary and treasurer.

Practical Subjects—Discussions

Portable Wireless Telephone for Motor Cars.

A Los Angeles inventor has just perfected a portable wireless telephone for use with motor cars, says the Motor Age. The apparatus is contained in the box and case seen on the running board of the gasoline car in the illustration. This contains both the sending and receiving apparatus to which the headpiece and transmitter are connected. It is so light and simple that it can be connected to any vehicle or car in a few minutes.

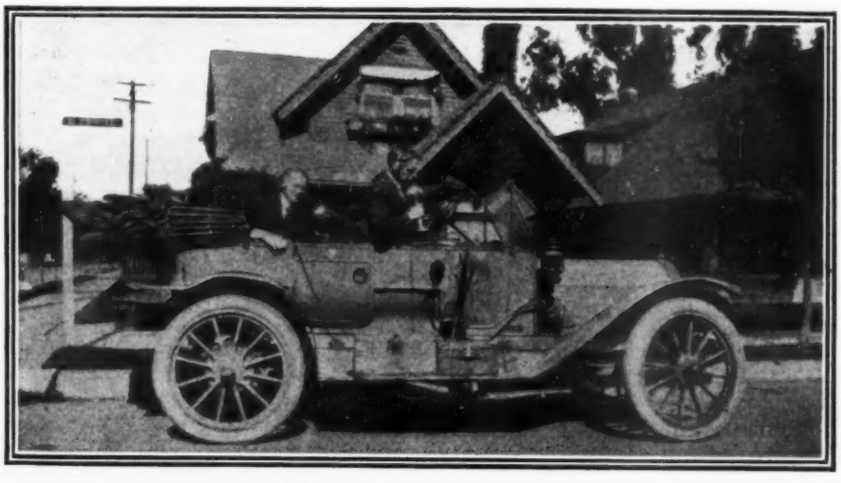
With this device communication may be had with another machine either moving or standing still, or with a central station.

The uses to which this remarkable invention may be put are many and varied. The expense is so small that it is expected it will soon be as common on cars as the wireless is at present on steamships.

By means of this apparatus the terrors of crossing deserts and similar stretches of country will be entirely eliminated, as the driver of a car equipped with this wireless can be in constant touch with other drivers or stations from where help could be dispatched.

This device could also be used in forest patrol work and help summoned instantly in case of forest fire. Physicians with their car equipped with this could be in constant touch with their office while making calls.

The inventor of this wireless gets his power from batteries and uses 50 volts where other systems use from 25,000 to 100,000 volts. He employs low frequency while all other systems employ high frequency. Instead of employing high towers for aerials this inventor strings wires from the front to the rear seat. The apparatus also is built for use in electric cars. The equipment in this instance is placed in boxes finished in a style to match the interior of the electric.



Portable Wireless Telephone Outfit Attached to a Motor Car.

Shadows and Sunshine Along the Telephone Trail.

By Well Clay.

I dined one day with the rich and great,
Surrounded by polish and pomp and plate.
Soft-voiced servants stood at my chair
And served the viands both rich and rare,
But the leaden hours dragged them by,
Leaving no joy, I knew not why.

In a tiny cottage one winter's day,
Snowbound, I whiled the hours away.
The housewife plied at a noisy loom
And happy children played 'round the room,
Forgetting the storm and the leaden sky
As the joyous hours flew swiftly by.

As night shut down and wild winds roared
We gathered 'round their humble board,
On which was spread the plainest fare,
Nor served on dishes fine nor rare;
A simple grace, thanking God on high—
'Twas a joyful time, do you know why?

I have sometimes thought that the manager and workmen of a little exchange were about as well off, when it came to reasons for being contented with their jobs, as the employes of larger concerns. True, they have mighty little to work with sometimes and have to figure a way out of the most of their troubles without any of the modern equipment which the specialists in the big companies use. By specialists, I mean the wire chiefs, cable splicers, the switchboard men, the bookkeepers and the managers of different departments.

While it seems that their duties, circumscribed as they are, are much more easily performed through greater familiarity and much repetition, yet when there is little effort, there is often little interest.

With us, each different case of trouble and each different phase of management calls for considerable thinking, as a rule. While, in most cases, we do not get the job done as expeditiously nor as good as our city cousins, we probably take more interest in each new thing that comes to us for solution because we have what they probably sometimes lack.

As a rule, most telephone men in small exchanges have a pretty general knowledge of the entire plant and are able to see the relation between the individual act and the complete working of the plant better than department men. Oftentimes the manager is the whole force, from trouble-shooter to financial agent. In such a man, the proper vision as to matters under his charge will be of the utmost importance.

If that vision is right, and the man is energetic and optimistic, he will be one of the most contented men in the world. He will forget himself in his work and time will be as nothing between the beginning of the day's work and the close.

His office is under his hat and all the information relating to the plant in his mind. He sees in his mind each separate contact, connection and part of the plant at will. In case of trouble, his mind gives him a photograph of its probable location and its determining causes. He knows each tree and pole and wire, as well as its general environment. For him there is no need of consulting maps and drawings and blueprints when his services are needed. He also knows each subscriber and his peculiarities and knows how much to take into consideration the bearing which they may have on the case in hand.

With the city employe of a telephone company, the subscriber is an unknown quantity to most of the men who have to do with the plant department. The trouble card, when turned over to the wire chief, does not create in his mind any long stretch of line through a pleasant landscape; no woods nor hills between which flow streams crossed by long span reaches between poles; no pieces of drop wires leading through clumps of evergreens up to some neatly-painted cottage; no cosy interiors of rooms; no people, pleasant or otherwise.

It tells him nothing except that a telephone or line with a certain meaningless number is out of commission. He merely tests out the line and turns the information obtained over to the next man, whose business it is to see if the trouble is in his section. The wire chief does not see the slack guy wire, the drooping branches of the willow, the rotten cross arm, the oft-spliced section where threshing machines go under in autumn, the drop wire rubbed bare in the evergreens, the cottage door which bangs against the transmitter when carelessly opened, nor a hundred other weaknesses along the

line whcih are visualized by the repairman in a small exchange when the subscriber reports to him personally a case of trouble on the line or at a station.

The city man has many advantages, one of which is that he does not often come in actual contact with the subscriber. He may meet up with a few servants and quite often the lady of the house, if he is the man who actually attends to the instrument trouble—but one move from him and none of the employes comes in personal relations with the patron until we reach the collector. He, by the way, knows nothing about those little matters of which the patron may complain in regard to the service and consequently can not handle situations which occasionally arise quite so intelligently.

In fact, the country telephone man is able to cope with almost any situation which confronts him in the conduct of his business except one. That one is more fundamentally important to his general welfare than all the others. In the question of getting a sufficient revenue from the public for the service which his company is rendering, he is generally a weakling.

He seems content rather to live on rosy dreams of future returns than the more concrete method of stirring up a little trouble and getting a just return for the present. He hates a muss, and he hates trouble among friends, so he drifts along performing a valuable service for the public without adequately participating in the rewards which are supposed to be for the faithful.

He works on holidays, on Sundays, and when the circus is in town and complains not. He takes for his wages only the ordinary returns which the common laborer would earn yearly if he worked every day. He wears not raiment and fine linen, but clothes himself in durable duck and blue denim.

He risketh his life divers and many times in a week and takes no note nor mentions the perils at home, though the darkened parlor and the funeral wreath may at any time be his reward from a rotten pole or a high voltage current. He puffeth not himself up with pride of achievement nor accumulates an account in the savings bank. Day by day, and week on end, he keeps things working and sees that the community has telephone service by night and by day.

Many advantages, however, are his.

He works often in pleasant country places and the scent of new-mown hay is not a stranger to his senses. His drives are frequently along the winding river or the lake shore, and he works not on the self-same spot two days in succession. One day he will be here and another there.

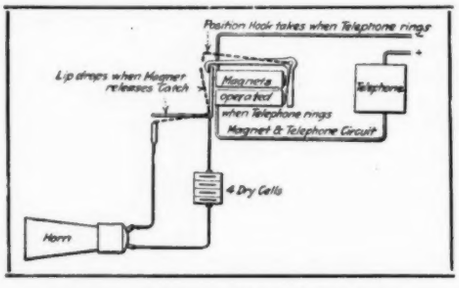
He goes forth from a stately mansion and crawls into a coal bin at the garbage man's house in an endeavor to find a broken wire. He may work one hour on his back under an office desk and the next, 40 feet up in the air on a pole down by the mill dam. His is a varied career and a contented frame of mind.

APHORISM: Some ask only for work—and get it.

Used Klaxon Automobile Horn As a Telephone Call Signal.

How a Klaxon automobile horn was used on a construction job as a telephone call bell is related in the Engineering News-Record. The wiring arrangement is shown in the diagram.

The office was situated on a hill and when the telephone rang, the bell could not be heard unless someone were near it. An electromagnet similar to that ordinarily used in a call bell was placed in the telephone circuit so that when the telephone rang, the action of the magnet raised a latch that released a "lip," or drop. When this drop fell it automatically closed a circuit into which a Klaxon horn was wired with four dry cells. This circuit, of course, would remain closed, and the horn would continue to sound until someone came and put up the drop.



Wiring of Klaxon Horn Call Signal.

At night, and when there was no one on the work, it was a simple matter to disconnect one of the wires and break the circuit, eliminating the danger of exhausting the dry cells in case the telephone should ring when no one was there to put up the drop. As the work was down in the river bed and some distance from town, there was no chance of confusing the signal with other automobile horns.

School for Plant Department Employes of Lincoln Company.

A training schol for plant department employes has been established by the Lincoln (Neb.) Telephone & Telegraph Co. It will be under the supervision of Prof. F. C. Holtz of the electrical engineering department of the Nebraska State University, with Plant Inspector Ray H. Elliott in actual charge.

The company experimented so successfully with a correspondence school for toll operators that it was determined to extend the benefits of the plan to the plant department. Every member, no matter where located, will be eligible to membership, and will be taught by mail. Prof. Holtz will prepare the pedagogical data necessary.

The courses will be two in number. Reversing the usual order, theory will be taught last. The first course will consist of a description and discussion of the equipment, what each part is for and how to properly maintain and handle it. The inside equipment will be first taken up and afterwards outside construction. The theory of the business will be taught in the second course, which will be highly technical as compared with the first or non-technical course. The reason for this lies in the fact that the company has lost a number of employes through enlistment and the draft and an emergency exists which requires giving the practical work first.

An interesting application of psychology to business is the employment of a university professor and the elimination of the plant superintendent and his executives from any connection or oversight of the school. In this way it is believed men will be made to feel free to ask all sorts of questions about the things that have bothered them in the past and which they were reticent about propounding to their chiefs because the latter might conclude they were too ignorant to remain in the service. Because they did not wish to endanger their jobs they kept silent. With only a university professor in charge of their conscience and correspondence, men will be expected to ask all the questions that have remained puzzles to them.

The company has followed the practice in the past of compiling instructions on how to do things and handing the little black book containing these over to the wire chiefs with instructions to take excellent care of it. The result has been that the wire chief keeps it under lock and key and company practice and construction remain a sealed book to the plant department men save as experience and observation reveal them. It is suspected that many of them often did not know what the plant superintendent was talking about in his various addresses to them.

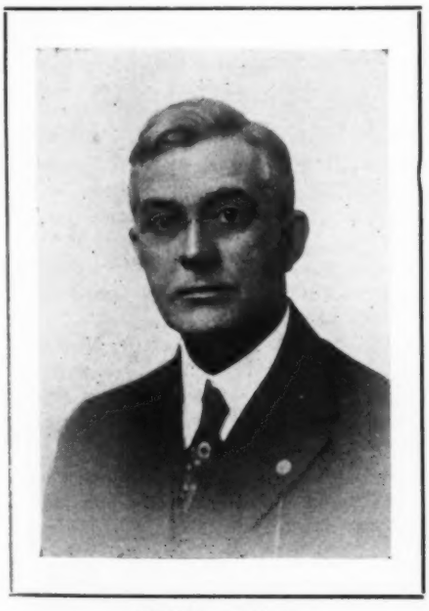
The data is now in course of preparation. It will be divided into lesson sheets and the same method of distribution will be employed as in the case of the toll operating correspondence school. President Frank H. Woods and General Manager L. E. Hurtz are enthusiastic over the proposition, and look for excellent results. One of the results of the toll operating correspondence school was an immediate increase in the efficiency of the toll operating that enabled the company to handle most of its increased business without the addition of any new facilities.

Biographical and Personal Notes

William H. Hay, of Pittsburgh, Pa., state service engineer of the Eastern Traffic Association, is a native of Indiana and received his education in the grade and high schools of Indianapolis, his home town. Prior to entering the telephone business, Mr. Hay had a "look-in" on various lines of business, as clerk with a fire insurance company, stock boy in a wholesale millinery, doing clerical work in a railroad freight office, fraternal insurance and newspaper work. He also served two three-year enlistments in the national guard of Indiana.

Entering the telephone field in November, 1900, with the Pittsburgh & Allegheny Telephone Co., at Pittsburgh, Mr. Hay served successively as solicitor, groundman, lineman, traffic inspector, directory clerk, cable record clerk, jumperman on the main distributing frame, troubleman, cable splicer, cable foreman, finally winding up in the engineering department where his duties were numerous.

In 1905 Mr. Hay left the employ of the Pittsburgh & Allegheny company and went with the Central District Printing Telegraph Co. During his seven years' connection with that company he served in the construction engineering division as field engineer, working on underground cable layouts, aerial construction generally and some subway construction. Before leaving the company's employ, he attained the post of chief fieldman with the direction of some ten or twelve field



William H. Hay.

engineers. In this period, he specialized in block system and building distribution, having planned the cable layouts for a number of the largest skyscrapers in his territory.

From 1912 to 1914 he was employed in the telephone department of the Philadelphia Co., at Pittsburgh, on general engineering work. In December, 1914, Mr. Hay was made service engineer for the Western Pennsylvania Independent Telephone Association, which position he held until November, 1916, when he was appointed to his present office of state service engineer for the Eastern Traffic Association of Independent Telephone Companies.

Acting under the auspices of the Western Pennsylvania association and the Eastern Traffic Association, Mr. Hay organized and conducted two series of operators' schools of instruction in long distance operating practice, covering Western Pennsylvania and New York state and one series covering Eastern Pennsylvania. He also planned a third series for Western Pennsylvania which was conducted by Mrs. Nancy D. Baines, traveling chief operator of the Eastern Traffic Association, under his supervision.

The object of this work was the standardization of long distance operating practice in all its details, including the adoption of the standard form of toll tickets. As a result, the operating rules issued by the United States Independent Telephone Association are now standard and in use all over the state of Pennsylvania generally and standard toll tickets are also generally used.

Mr. Hay was chairman of the standardization committee of the old Independent Telephone Association of America and was later a member of the plant committee of the United States Independent Telephone Association. During the year 1916 he served as secretary of the Western Pennsylvania Independent Telephone Association.

In connection with his work as service engineer he is now engaged in the compilation of standard routings for Independent toll lines of Pennsylvania.

Mr. Hay is energetic and most dependable. He is careful in what he undertakes and promises only what he can perform well. Of a practical nature, he is quick to see the adaptation of things to purposes in which he is interested and to understand the theoretical side also. When Mr. Hay makes a statement it may be relied upon to be conservative and based upon unquestioned facts.

Arthur M. Crichton, general manager of the Tri-State Telegraph & Telephone Co., Uniontown, Pa., was born and raised in Chicago. He entered the telephone business at the age of 20 in the installation department of the Kellogg Switchboard & Supply Co. In 1905 he was employed by the United Telephone & Telegraph Co., at Altoona, Pa., and later was associated with the Quincy Home Telephone Co. and the American Union Telephone Co. for short periods, going with the Tri-State company of Uniontown in 1907. That company is in a prosperous

Arthur M. Crichton.

condition and has a constantly increasing subscribers' list.

No small part in the company's success was taken by Mr. Crichton, for he is a good business man and an executive of practical judgment and experience. Capable of working long hours himself, Mr. Crichton has led in the hard work of pushing the Tri-State company to the front.

Measured telephone service is a hobby of Mr. Crichton and he has made an extensive study of it. This has resulted in the development of a meter for measuring service which is being operated most satisfactorily in New Castle and Uniontown.

He is a member of the Western Pennsylvania Independent Telephone Association, for which he served as secretary-treasurer during 1915-16, and also the United States Independent Telephone association. He is a Mason.

E. C. Constans, general superintendent of the Montgomery County Telephone & Telegraph Co., Hillsboro, Ill., was a visitor at TELEPHONY's offices this week.

John Wells, of Springfield, Mo., recently purchased the Crane Telephone Co., at Crane, Mo., and has already assumed charge of the plant.

Obituary.

W. H. Sory, owner and promoter of the Jacksonville Telephone Co., Jacksonville, Texas, passed away recently at the age of 67.

Financial Statements and Reports

Synopsis of Annual Reports of a Number of Nebraska Telephone Companies for the Year Ended June 30, 1917—Report on Telephones and Telegraphs in South Africa—Earnings of the Keystone Telephone Company for August

Report on Telephone and Telegraphs in South Africa.

The effect of the war on the telephone service has been scarcely appreciable at the larger exchanges in South Africa where spare circuits for the partial development of new subscribers generally existed, according to the report of the postmaster general for 1916. The actual development that has taken place throughout the system during the year represents an increase of 10.1 per cent. in the number of subscribers' stations and of 13 per cent. in earnings. This is equal to 58 per cent. and 78 per cent. respectively of the pre-war rate of yearly increase.

There are, however, many applications for telephone facilities throughout the country which the department is still unable to meet and this position is not likely to be changed for some time to come.

On June 1, 1915 the charges for toll calls were increased from 3d (six cents) for each 25 miles to 3d for each 15 miles up to 120 miles and 6d (12 cents) for each 25 miles thereafter. The old rates resulted in a loss of approximately £28,000 ($140,000) per year. The new charges have resulted, thus far, in a drop of 10 per cent. in the traffic and an increase of 24 per cent. in the revenue.

Following is a comparative table of telephone and telegraph statistics:

	1915.	1916.
Telegraph offices open	1,656	1,695
Miles of telegraph wire	54,256	54,031
Miles of telephone wire	97,148	104,707
Telegrams dealt with	6,165,568	5,692,873
Telephone exchanges.	1,923	2,038
Telephones in use	32,144	35,463
Telephone calls	62,076,867	64,629,878

Annual Reports Filed by Nebraska Telephone Companies.

Following is a synopsis of the annual reports of a number of Nebraska Independent telephone companies made to the state railway commission, covering operations for the year ended June 30, 1917:

Albion—capital stock, $55,000; earnings, $16,650; expenses, $10,594; passed to surplus, $1,813. Telephones, farm, 462; town, 418; total, 880.

Ansley—capital stock, $13,950; earnings, $7,962; expenses, $5,616; dividends paid, 6 per cent., $837; passed to surplus, $1,-246. Telephones, farm, 326; town, 260; total, 586.

Bartley Mutual—capital stock, $7,560; earnings, $4,737; expenses, $2,442; passed to surplus, $2,289. Telephones, farm, 216; town, 69; total, 285.

Beaver City—Capital stock, $16,966; earnings, $8,601; expenses, $5,439; dividends, 2½ per cent., $849; passed to surplus, $390; telephones, farm, 311; town, 247; total, 558.

Blair—capital stock, $10,000; earnings, $24,050; expenses, $23,771, including heavy rebuilding. Telephones, farm, 641; town, 561; total, 1,202.

Bloomington — capital stock, $8,000; earnings, $3,599; expenses, $3,339; passed to surplus, $135. Telephones, farm, 97; town, 138; total, 225.

Burchard—capital stock, $5,300; earnings, $4,552; expenses, $2,707; dividends paid, 20 per cent., $1,060; passed to surplus, $685. Telephones, farm, 200; town, 61; total, 261.

Campbell—capital stock, $6,575; earnings, $2,780; expenses, $2,264; passed to surplus, $500. Telephones, farm, 263: town, 102; total, 365.

Chapman—Capital stock, $6,480; earnings, $3,681; expenses, $2,685; dividends, 10 per cent., $648; passed to surplus, $348; telephones, farm, 247; town, 71; total, 318.

Citizens, of Malmo—capital stock, $13,-000; earnings, $11,646; expenses, $9,311; passed to surplus, $1,662. Telephones, farm, 565; town, 171; total, 736.

Cortland—capital stock, $7,950; earnings, $3,494; expenses, $2,673; dividends paid, 10 per cent., $795; passed to surplus, $15. Telephones, farm, 165; town, 55; total, 220.

Crete Telephone Co.—capital stock, preferred and common, $97,700; earnings, $21,641; expenses, $6,670; dividends paid, $6,920; set aside for depreciation, $6,172; passed to surplus, $770. Telephones, farm, 441; town, 510; total, including service stations, 964.

Crownover, Sargent — capital stock, $21,156; earnings, $9,324; expenses, $2,-735; dividends paid, 3½ per cent., $740; passed to surplus, $2,267. Telephones, farm, 147; town, 192; total, 339.

Davenport & Kiowa, Davenport—capital stock, $5,800; earnings, $4,142; expenses, $3,201; dividends, 7 per cent., $402; passed to surplus, $440. Telephones, farm, 150; town, 125; total, 275.

Dawson—capital stock, $7,375; earnings, $4,149; expenses, $3,586; dividends paid, 6 per cent., $443. Telephones, farm, 75; town, 205; total, 280.

Dubois—capital stock, $7,900; earnings, $3,528; expenses, $2,231; dividends paid, 12 per cent., $957; passed to surplus, $206. Telephones, farm, 191; town, 68; total, 258.

Eagle—Capital stock, $4,860; earnings, $2,904; expenses, $1,917; dividends, 15 per cent., $723; passed to surplus, $221; telephones, farm, 161; town, 61; total, 222.

Edgar—Capital stock, $30,000; earnings, $2,393; expenses, $1,106; passed to surplus, $1,277; telephones, farm, 238; town, 353; total, 591.

Farmers, of Alexandria—capital stock, $9,800; earnings, $4,095; expenses, $2,470; dividends paid, 9 per cent., $882; passed to surplus, $653. Telephones, farm, 233; town, 83; total, 316.

Hamilton County Farmers, Aurora—capital stock, $41,580; earnings, $51,394; expenses, $40,255; passed to surplus, $7,-070. Telephones, farm, 1,293; town, 1,-176; total, 2,469.

Hardy—capital stock, $10,000; earnings, $3,908; expenses, $2,836; dividends paid, 8 per cent., $800; passed to surplus, $194. Telephones, farm, 225; town, 110; total, 335.

Hay Springs—Capital stock, none; earnings, $2,320; expenses, $1,863; passed to surplus, $433; telephones, farm, 172; town, 85; total, 251.

Herman—captal stock, $6,000; earnings, $5,563; expenses, $4,208; dividends paid, 20 per cent., $1200; passed to surplus, $155. Telephones, farm, 299; town, 72; total, 371.

Holbrook—Capital stock, $12,000; earnings, $2,513; expenses, $2,268; passed to surplus, $212; telephones, farm, 265; town, 99; total, 364.

Humphrey—Capital stock, $31,000; earnings, $11,062; expenses, $9,084; passed to surplus, $1,688; telephones, total, 757.

Interstate, of Wilsonville—capital stock, $9,000; earnings, $3,945; expenses, $2,899; dividends paid, 10 per cent., $900; passed to surplus, $166. Telephones, farm, 202; town, 81; total, 283.

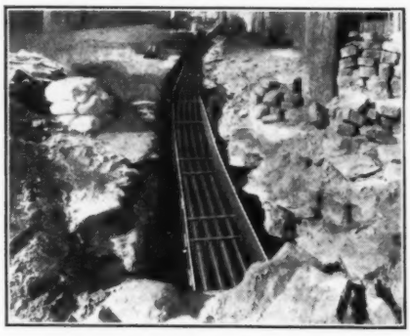
Kearney County Independent, Norman—capital stock, $13,080; earnings, $5,579; expenses, $4,575; passed to surplus, $600. Telephones, farm, 396; town, 78; total, 474.

Liberty—Capital stock, none; earnings, $3,317; expenses, $2,802; passed to surplus, $465; telephones, farm, 345; town, 21; total, 366.

Madison—capital stock, $10,750; earnings, $10,612; expenses, $6,127; set aside for depreciation, $1,200; dividends paid, 16 per cent., $1,720; passed to surplus, $1,-316. Telephones, farm, 215; town, 283; total, 498.

Meadow Grove—capital stock, $5,000; earnings, $1,442; expenses, $2,824; divi-

Johns-Manville Fibre Conduit



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Cumberland County Power & Light Co.
Portland, Me.

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COVERS THE CONTINENT

Leakage leads to electrolysis — the tight joints of Johns-Manville Fibre Conduit ward it off

A tiny leak—a circuit established for stray current—and then electrolysis and the destruction of your cable sheaths. Bad enough—but the congestion of underground structures in city streets makes it unlikely that trouble will stop here. Damage to water or gas mains, followed by costly controversies between public utilities, may also be traced back to that first leak.

Tight joints are your best protection against electrolysis—and this spells Johns-Manville Fibre Conduit. Highly dielectric, not easily cracked or broken, and laid in single ducts, so that joints can be staggered—an impossibility, with multiple duct conduits. Joints are machined, socket and spigot, and can be made water, air or gas-tight without burlap wrappings.

Johns-Manville Fibre Conduit is cheap to lay, lasts indefinitely, and possesses many features of practical value you should know about.

H. W. JOHNS-MANVILLE CO.
NEW YORK CITY
10 Factories—Branches in 54 Large Cities

OUR EXTRA HEAVY DOUBLE GALVANIZED WIRE INSURES
HIGHEST EFFICIENCY.
LONGEST LIFE.
LOWEST COST OF UPKEEP.

It's easy to determine, TEST IT.

As wire will test best, so also will it last best and give better satisfaction while it lasts.

We guarantee our wire to conform with all standard specifications as well as to be satisfactory to the purchaser.

IT'S THE ONE BEST PROVEN BY TEST.—*TRY IT.*

Handled by most representation jobbers and supply houses.

Write for samples, test and compare.

INDIANA STEEL & WIRE COMPANY
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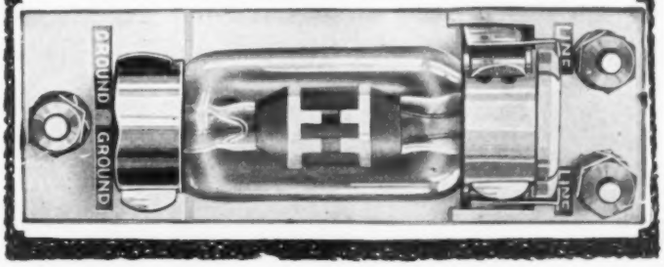
The Arrester that always arrests

VAC-M

¶ No. 3B represents the highest development in telephone protection. The superior efficiency of VAC-M arresters is due to the use of the vacuum principle that has proved especially satisfactory in the telephone field. ¶ VAC-M arresters do not interfere with service currents—never ground the line—are proof against lightning, induction, crosses, high tension, sneak currents, etc. ¶ Write for VAC-M Catalog.

National Electric Specialty Co., 303 Terminal Bldg., Toledo, Ohio
Alger Supply Co., Peoples Gas Bldg., Chicago, General Sales Agts.



dends paid, 25 per cent., $1,250; passed to reserve, $325.

Monroe Telephone Co., Newman Grove—capital stock, $57,525; earnings, $30,431; expenses, $20,392; dividends paid, $5,627; passed to surplus, $3,840. Total assets of company, $105,515; loans, $6,600; surplus reserve, $37,163; depreciation reserve, $2,524. Telephones, farm, 1,414; town, 664; total, 2,078.

Naponee Home—capital stock, $4,350; earnings, $2,983.12; expenses, $2,312; dividends paid, 7 per cent., $304.50; passed to surplus, $284.62. Telephones, 221.

Northern Antelope, Neligh—Capital stock, $30,000; earnings, $16,906; expenses, $8,824; dividends paid, 8 per cent., $2,400; passed to surplus, $3,429; telephones, farm, 455; town, 309; total, 764.

Northern, Creighton—Capital stock, $50,000; earnings, $12,723; expenses, $7,179; dividends paid, 8.4 per cent., $3,701; passed to surplus, $1,640; telephones, farm, 300; town, 331; total, 631.

Northwestern, Neligh—Capital stock, $10,000; earnings, $7,585; expenses, $4,898; dividends paid, 9 per cent., $905; passed to surplus, $1,471; telephones, farm, 35; town, 415; total, 450.

Ohiowa—Capital stock, $10,000; earnings, $4,822; expenses, $3,053; passed to surplus, $1,769; telephones, farm, 308; town, 97; total, 405.

Osmond—Capital stock, $6,458; earnings, $3,284; expenses, $3,174; passed to surplus, $21; telephones, farm, 151; town, 93; total, 244.

Palmer—Capital stock, $5,975; earnings, $6,628; expenses, $3,861; dividends paid, 10 per cent., $581; passed to surplus, 687; telephones, farm, 230; town, 133; total, 363.

Peru—Capital stock, $8,525; earnings, $5,980; expenses, $5,346; dividends, 6 per cent., $521; passed to surplus, $99; telephones, farm, 166; town, 225; total, 391.

Pierce—Capital stock, $16,000; earnings, $6,102; expenses, $4,396; shortage in income, $347; telephones, 223.

Platte Valley—Capital stock, $150,000; earnings, $65,720; expenses, $47,361; dividends paid, $6,197; passed to surplus, $8,436; telephones, farm, 454; town, 1,750.

Plymouth—Capital stock, $9,975; earnings, $5,202; expenses, $3,542; dividends paid, $798; passed to surplus, $565; telephones, farm, 208; town, 79; total, 287.

Ravenna—Capital stock, $24,950; earnings, $9,467; expenses, $6,954; dividends paid, 6 per cent., $1,497; passed to surplus, $802; telephones, total, 587.

Republican Valley, Franklin—Capital stock, $9,185; earnings, $4,650; expenses, $4,646; passed to surplus, $4; telephones, farm, 76; town, 189; total, 265.

Shell Creek, Bradish—Capital stock, $9,480; earnings, $2,752; expenses, $1,541; dividends, 8 per cent., $761; passed to surplus, $426; telephones, farm, 232; total, 232.

Steele City—Capital stock, $12,775; earnings, $6,347; expenses, $4,845; dividends paid, 8 per cent., $1,022; passed to surplus, $480; telephones, farm, 350; town, 50; total, 400.

Stella—Capital stock, $7,000; earnings, $7,423; expenses, $6,822; dividends paid, 20 per cent., passed to surplus, $501; telephones, farm, 391; town, 281; total, 672.

Summerfield—Capital stock, $1,875; earnings, $5,012; expenses, $3,627; dividends paid, $900; passed to surplus, $349; telephones, farm, 216; town, 140; total, 356.

Sutherland—Capital stock, $6,000; earnings, $3,609; expenses, $2,834; dividends paid, 12 per cent., $720; passed to surplus, $27; telephones, farm, 57; town, 154; total, 211.

Table Rock—Capital stock, $14,275; earnings, $6,237; expenses, $4,099; dividends paid, 11 per cent., $1,570; passed to surplus, $360; telephones, farm, 182; town, 153; total, 235.

Tilden—Capital stock, $10,000; earnings, $4,480; expenses, $3,930; passed to surplus, $495; telephones, farm, 55; town, 213; total, 268.

Unadilla—Capital stock, $3,750; earnings, $3,180; expenses, $2,695; passed to surplus, $435; telephones, farm, 197; town, 40; total, 237.

Valparaiso—Capital stock, $28,600; earnings, $11,768; expenses, $10,612; passed to surplus, $291; telephones, farm, 286; town, 122; total, 408.

Wauneta—Capital stock, $5,360; earnings, $2,452; expenses, $2,594; passed to surplus, $107; telephones, farm, 152; town, 152; total, 321.

Wehn (Oshkosh)—Capital stock, $25,000; earnings, $5,871; expenses, $5,995; telephones, farm, 107; town, 152; total, 267.

Wilcox—Capital stock, $5,300; earnings, $3,228; expenses, $1,865; dividends paid, $1,160; passed to surplus, $153; elephones, farm, 125; town, 106; total, 231.

Wolbach—Capital stock, $25,100; earnings, $4,895; expenses, $3,800; passed to surplus, $1,004; telephones, farm, 245; town, 113; total, 358.

Earnings of the Keystone Telephone Co. for August.

The Keystone Telephone Co., of Philadelphia, Pa., has issued its comparative statement of earnings for the combined companies for the month ended August 31 and the eight months ended on that date, as follows:

	For month ended August 31, 1917.	Year previous.
Gross earnings	$ 132,327	$122,473
Operating expenses and taxes	73,620	65,021
Net earnings	58,707	57,452
Less interest charges.	28,042	27,453
Surplus and reserve..	30,665	29,999

	For 8 months ended August 31, 1917.	Year previous.
Gross earnings	$1,040,703	$963,215
Operating expenses and taxes	544,228	486,255
Net earnings	496,475	476,960
Less interest charges.	222,857	219,623
Dividends	106,527	96,843
Surplus and reserve..	167,091	160,494

Annual Report of Union Telephone Co. of Wausa, Neb.

The Union Telephone Co., which operates exchanges at Wausa, Bloomfield and Crofton, Neb., with a total of 1,203 subscribers, has just filed its report for the year ended June 30, 1917, with the state railway commission. The report shows that in addition to maintaining its plant, the company paid 15 per cent. dividends and passed to surplus a sum exceeding the dividend payment. The financial statement follows:

Assets.	
Real estate	$ 3,557
Buildings	12,852
Exchange central equipment	3,784
Exchange aerial equipment	18,171
Exchange subscribers' stations	14,909
Toll equipment	4,554
Utility equipment	1,350
Material and supplies	1,366
Cash on hand and in bank	877
Accounts receivable	6,248
Bills and notes receivable	411
Stocks and bonds owned	650
Post office equipment	800
Prepayments by subscribers	454
Total	$69,983
Liabilities.	
Capital stock	$25,000
Loans and notes payable	1,000
Accounts payable	2,537
Surplus reserve	35,701
Depreciation reserve	5,745
Total	$69,983
Earnings.	
From toll service	$ 4,069
From subscribers' service	18,128
Switching	1,624
Sundry sales	386
Miscellaneous earnings	1,176
Total	$25,383
Expenses.	
Maintenance and depreciation	$ 4,632
Operative	7,616
General	4,930
Total	$17,178

The net operating income of $8,205 was distributed as follows: Interest, $14; taxes, $365; 15 per cent. dividend paid, $3,750; passed to surplus, $4,076.

To Erect New Building.

The Badger Telephone Co., of Mapleton, Wis. (R. D. from Oconomowoc), is soon to begin the erection of a telephone exchange building of two stories, with a garage and barn in connection. J. J. Reid is chairman of the building committee.

SWEDISH AMERICAN

No. 77 Common Battery Wall Type Telephone

Another favorite in the Independent telephone field.

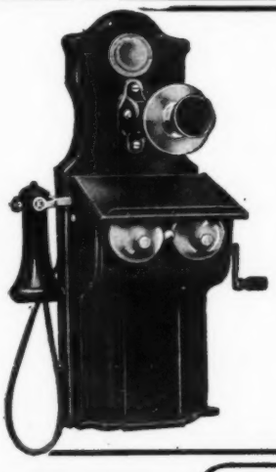
Equipped with our standard common battery transmitter, which has a record of ten years' perfect service.

All the working parts of the transmitter are so arranged that they reproduce the human voice with a clearness and purity of tone never before equalled in the history of telephony.

The materials and workmanship are of the high quality which has always characterized SWEDISH-AMERICAN products.

Swedish-American Telephone Mfg. Company

5235-5257 Ravenswood Ave. :: Chicago



ERICSSON TELEPHONES

If you desire telephones of quality and high class appearance, standardize on the Ericsson line.

Forty years of experience behind our products.

An absolute guarantee that is a guarantee in the full sense of the word goes with each instrument. You money back if not satisfied.

Catalog sent on request

ERICSSON MFG. CO., TEL. DEPT.

45 NORTH DIVISION ST. BUFFALO, N. Y.

Door Open

The "French" FOLDING DOOR Telephone Booth

(Patent Pending)

DOOR OPERATION: One of the distinctive advantages of the FOLDING DOOR is that it can be both closed and opened by pulling on the handle. This feature, which is an important one from the booth user's standpoint, is possible only with this type of door.

Write for booklet describing the advantages of the "Folding Door" Booth

C. B. FRENCH CABINET COMPANY, Inc., Brooklyn, N. Y.

DISTRIBUTORS

Western Electric Company

INCORPORATED

Houses in all principal cities

Door Closed

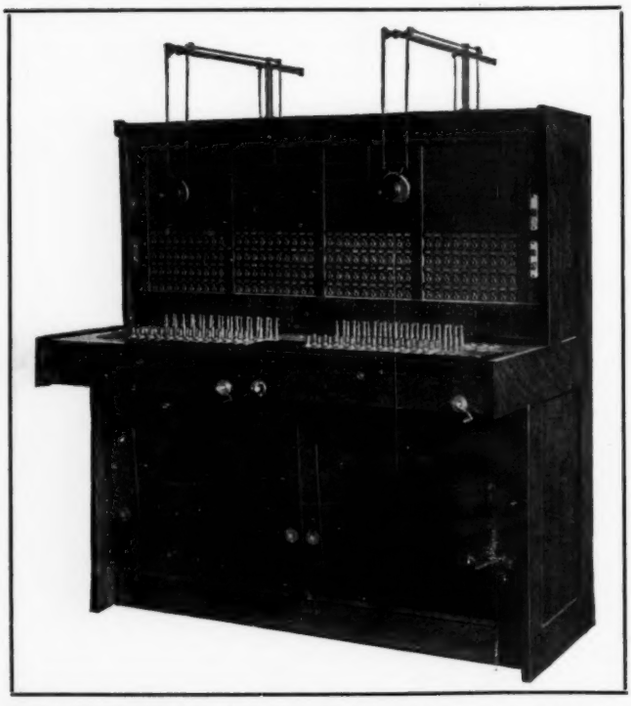
Please tell the Advertiser you saw his Advertisement in TELEPHONY.

From Factory and Salesroom

Convention: Ohio, Columbus, November 22-23

New Monarch Switchboard for Kansas City Company.

In order to meet the demands of a rapidly increasing suburban business the Kansas City Long Distance Telephone Co. has just completed a new and commodious building for the Hickman Mills exchange. In this new building has been installed one of the new model low floor type magneto switchboards manufactured by the Monarch Telephone Mfg. Co. of Fort Dodge, Iowa.



The Monarch New Model Low Floor Type Magneto Switchboard.

This low type board, one being shown in the illustration, is of pleasing appearance and is equipped with the Monarch company's standard apparatus such as has been in service for the last 12 years. The comfort afforded the operators working on this low type board will be no small factor in making this style of board popular. When the work on the Hickman Mills exchange is finished it will be one of the most complete and up-to-date small exchanges in the Middle West.

Method of Reducing Battery Cost on Magneto System.

The prices of dry batteries have been and still are going upward, and they, no doubt, will for some time to come. This makes it necessary to get all the possible current out of dry batteries.

On magneto party lines, considerable battery current is unnecessarily used by subscribers in listening to weather and grain reports, etc. This loss, at first thought, does not seem to be great, but the result of most careful investigations and tests on existing rural lines throughout the country is said to prove an annual loss from batteries wasted by "listening" of more than a quarter of a million dollars.

The loss of current from 20 listening telephones is not less than 8.4 watts, and as this energy comes from dry batteries, the loss is equivalent to burning about 30 25-watt Mazda lamps on ten-cent current. If any telephone manager should discover even three 25-110 volt lamps burning unnecessarily in broad daylight, he would not only turn them off before doing anything else, but would doubtless endeavor to locate the person responsible for such unnecessary waste, and caution him to avoid its happening again.

The accompanying illustration is a reproduction of a booklet issued by the Kellogg Switchboard & Supply Co. on battery savers. The Kellogg battery saver, as a long-needed remedy for the wasting of battery current, has proven remarkably successful wherever used.

Cover of Battery-Saver Booklet.

This battery saver is a simple device which does not interfere with the wiring of the telephone in any way, operating purely mechanically. Removing the receiver releases the hookswitch which is retarded by the battery saver in a position permitting connection of the listening circuit. This permits listening-in without using any of the battery current.

When desiring to talk, all that is necessary is to touch the battery saver which releases the hookswitch and permits the connection of the talking circuit. Upon returning the receiver to the hook, the battery saver returns to its original position.

The battery saver not only saves the battery current but also improves the service, as a practice of allowing transmitters to be "live" when a number of parties are merely listening, often produces so much foreign noise on the line that it becomes impossible to understand, even though the talking party's battery be in good condition.

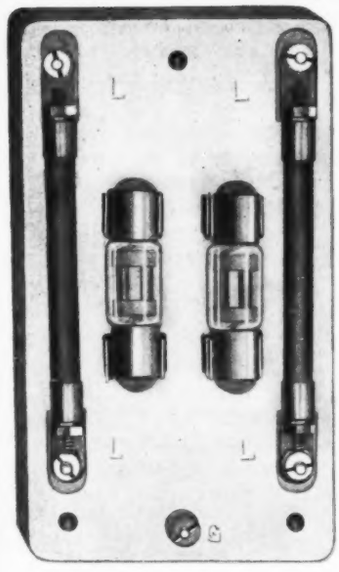
The Kellogg Switchboard & Supply Co. advises all rural companies to equip their telephones with battery savers as the expense is so trivial and the economy and service benefit so great.

Australian Government Orders Two More Automatic Exchanges.

The Australian government has recently placed orders for the equipping of two more exchanges for full automatic operation. These exchanges are the City North office in Sydney and the Malvern office in Melbourne.

Despite the tremendous drain of men, money and material incident to the splendid part the commonwealth is taking in the war, the government, which owns and operates the telephone system in that country, is finding means and time to carry out at least partially the program of rehabilitation laid down some five years ago, and is seeking to keep the telephone facilities abreast of the most pressing needs.

Compared with American standards, the use of the telephone in Australia has been rather backward, but of late this has been rapidly changing, and the demands made upon the telephone service are becoming most severe. This, together with the very much depleted staff, which has responded gallantly to the call to military service, and the need of funds for other purposes, has presented a most perplexing problem to the post office officials and engineers.



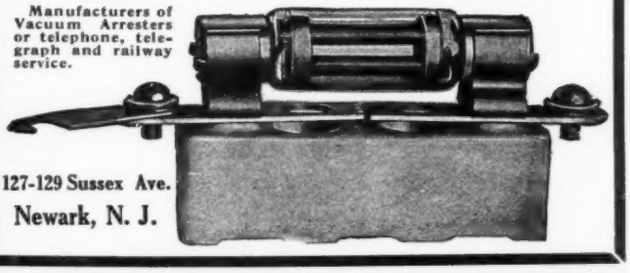
If you are satisfied to clean carbons, have noisy or ground lines, and are not interested in

VACUUM ARRESTERS

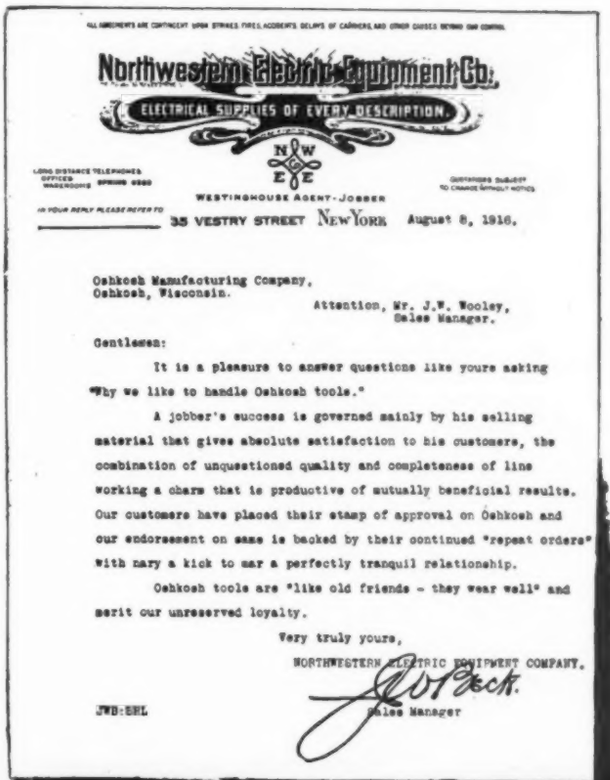
then you are going backwards. Our Service Department is waiting for your inquiry.

L. BRACH SUPPLY COMPANY

Manufacturers of Vacuum Arresters for telephone, telegraph and railway service.



127-129 Sussex Ave.
Newark, N. J.



Northwestern Electric Equipment Co.
ELECTRICAL SUPPLIES OF EVERY DESCRIPTION.
WESTINGHOUSE AGENT-JOBBER
35 VESTRY STREET NEW YORK August 8, 1916.

Oshkosh Manufacturing Company,
Oshkosh, Wisconsin.

Attention, Mr. J.W. Wooley,
Sales Manager.

Gentlemen:

It is a pleasure to answer questions like yours asking "Why we like to handle Oshkosh tools."

A jobber's success is governed mainly by his selling material that gives absolute satisfaction to his customers, the combination of unquestioned quality and completeness of line working a charm that is productive of mutually beneficial results. Our customers have placed their stamp of approval on Oshkosh and our endorsement on same is backed by their continued "repeat orders" with nary a kick to mar a perfectly tranquil relationship.

Oshkosh tools are "like old friends - they wear well" and merit our unreserved loyalty.

Very truly yours,
NORTHWESTERN ELECTRIC EQUIPMENT COMPANY.
Sales Manager

JWB:EHL

"Like Old Friends —they wear well"

Oshkosh Tools are good friends and true—

Standing up year after year—under all wear and tear—working hand in hand with the boys and never disappointing, has won them a friendship in the field, such as the Oshkosh brand alone enjoys.

Oshkosh Mfg. Co.
Oshkosh, Wis.

Oshkosh Jobbers are "Everywhere"

Fill Up Our Soldiers' Pipes

America's fighting men need tobacco to make trench life a little more comfortable. Here's a chance to treat the boys at the front.

"Our Boys In France Tobacco Fund" has been organized to furnish "smokes" for the American soldiers and sailors in active service.

All labor and administrative expenses are contributed so that every cent you give goes to pay for tobacco, which is purchased in large quantities at a low price.

One dollar buys four packages of tobacco and sends them to France. Each package, costing twenty-five cents, has a retail value of forty-five cents and keeps a man in "smokes" for a week. Every dollar sent to "Our Boys In France Tobacco Fund" buys a bundle of tobacco that would cost $1.80 at your cigar store.

In every package is a post card addressed to a contributor to the tobacco fund. In accepting the package, the soldier or sailor agrees to send on the card a message to his benefactor in the United States. According to the plan, every person who gives a quarter gets his receipt from a fighting man in France.

The work of this fund is approved by the Secretary of War and the Secretary of the Navy.

Send as many dollars as you can spare. Write your name and address clearly.

"Our Boys In France Tobacco Fund"
25 West 44th Street, New York City

But, despite this pressure, there has been no abandonment of the plans which were outlined after a most careful and exhaustive study of the telephone field and the trend of development in equipment and operating methods made in behalf of the government by John Hesketh, chief electrical engineer, and his associates during 1911 and 1912. As a result of these investigations, a course of construction was recommended which, based upon the general substitution of automatic equipment in all the major areas, would meet the requirements of the service for a period of at least 20 years.

As a result of Mr. Hesketh's report, a 1,100-line system was installed at Geelong in 1912. This has since increased to 1,600 lines and 13 additional offices, one at Perth, one in Melbourne and 11 in the Sydney area, have been placed in service, with an aggregate of over 23,000 lines.

Phoney Bill on Rising Costs.

In these days of rising costs, everyone—and particularly the telephone man—is vitally interested in obtaining full value for his money. The September blotter calendar of the Stromberg-Carlson Telephone Mfg. Co. shows Phoney Bill balancing a Stromberg-Carlson desk set on the scales with "cost" and a "fair profit." "Full measure and a square deal" is the "Quality Apparatus" booster's motto.

"Full Measure and a Square Deal."

Annual Report of Los Gatos (Cal.) Telephone Co.

The operating revenues of the Los Gatos (Cal.) Telephone Co. for the year ended December 31, 1916, were $14,570. The operating expenses totaled $9,586, leaving net operating revenues of $4,984. Adding non-operating revenues, $36, and deducting $1,501 for interest, taxes, rent, etc., left a net income of $3,519.

Of this amount $1,860 was paid in dividends. The surplus on December 31, 1916, was $8,597 as against $6,728 at the close of the preceding year.

Extensive Improvements to Correctionville, Ia., Exchange.

The New State Telephone Co. is making extensive improvements to its exchange at Correctionville, Iowa, the cost of which when completed will total in the neighborhood of $6,000. All the wires in the business section will be placed underground and the wire in the residence district will be placed in cable. New central office equipment will also be installed.

ADLETS

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TELEPHONE ENGINEER
1440 LUNT AVE., CHICAGO, ILL.
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Are Always in Training
They are fit for any battle.
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For Your Test Sets
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Consulting Electrical Engineer
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Construction Material and Supplies
Square deal, try us
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Plans, Specifications, Supervision of Construction
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Examinations and Reports
Financial Investigations and Rate Adjustments

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We make a variety of telephone cords for either general or special work. Tell us what you want and we'll gladly quote.
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Manufacturers
Yellow Pine Cross Arms, Pins and Brackets. Write us.
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H. P. TOPPING, Valuation Engineer
12 years exclusive telephone valuation work.
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Reports, Valuation, Telephone Engineering

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ELECTRICAL SUPPLY COMPANY
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TELEPHONE SUPPLIES

SUPPLIES
PROMPT SHIPMENTS: LOW PRICES
Write for Price List
DOUBLEDAY-HILL ELEC. CO.
PITTSBURG - - - WASHINGTON
(TELEPHONE DEPARTMENT)

OPPORTUNITIES—Continued

POSITIONS WANTED

POSITION WANTED—In South preferred, as manager or superintendent, by capable telephone man; experienced in engineering, operating and construction. No proposition too large. Correspondence invited. Address 2995, care of TELEPHONY.

WANTED—Position as wire chief, switchboard troubleman. Eight years' experience in magneto, common battery and toll work. Technical school graduate. Twenty-eight years old. Married. Now employed. Can furnish good references. Address 2996, care of TELEPHONY.

WANTED—Position as Commercial Manager and Auditor for Exchange of 1200-1500 stations. Nine years' experience all commercial departments. Best reference. Familiar with Interstate Commerce Commission Requirements and Reports. Salary, $110. Address, 2994, care of TELEPHONY.